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MECCANO MAGAZINE

December 1924

PRICE 3D

VOL. IX
No 12

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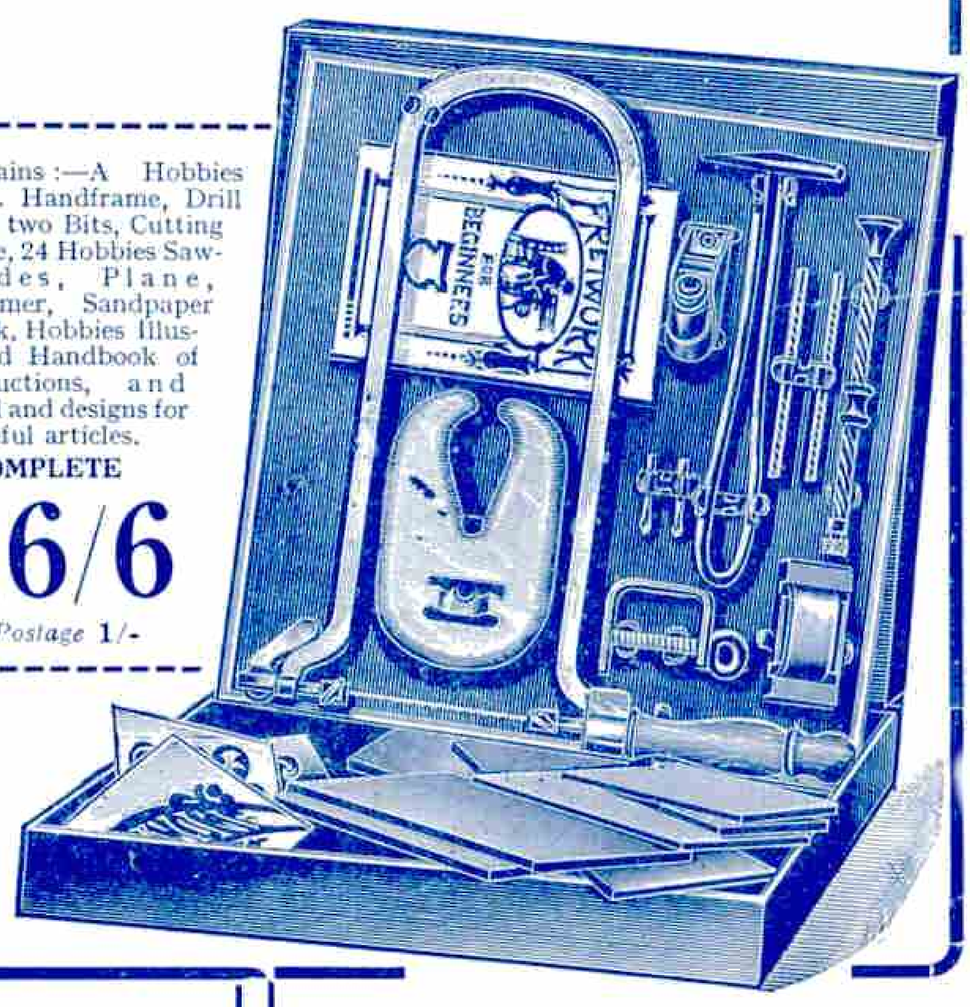
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EDITORIAL OFFICE
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Vol. IX, No. 12.

MECCANO MAGAZINE

PUBLISHED
IN THE INTERESTS
OF BOYS

December 1924



MY first thought this month, and my first words in this special Christmas number, must be to wish all my readers "A Very Merry Christmas."

Good Wishes

I hope that every one of you will have a good time during the coming holidays and that plenty of fun and frolic will fall to your lot. On Christmas morning I shall think of you all, and throughout the day I shall imagine the good times that you are having in all parts of the world.

The brotherhood of Meccano boys receives more recruits at Christmas than at any other time of the year, for some tens—perhaps even hundreds—of thousands of boys receive Meccano Outfits and Hornby Trains as Christmas gifts. When they receive these gifts they become members of a world-wide movement—great pleasures are in store for them and there are jolly times ahead. I am sure that on Christmas Day my readers will think of these things and will welcome the recruits with a friendly smile. As we have often agreed, it would be fine to have a great gathering of all Meccano boys, but such a gathering is, of course, quite impossible. Apart altogether from the language difficulty, there is no building in the world large enough to hold us all! Instead, we must content ourselves with broadcasting by our thoughts, a Christmas message of good will and friendship to all other Meccano boys—both old and new!

It is not always pleasant to be told that an article will cost you more, but I have no doubt that the 70,000 readers of the "*M.M.*" will be unanimous in their approval of my decision to increase the price of the Magazine to 3d. At present we cannot issue the "*M.M.*" more frequently, as many thousands of our readers have suggested. Instead, I am planning to increase the number of literary pages in future issues, and in order to make this possible it is necessary to increase the price as mentioned above. There are hundreds of wonderful subjects about which I want to tell you—Locomotives, Aeroplanes, Motor Cars, the Story of Metals, Giant Cranes, the Panama Canal, Famous Bridges, and a host of other interesting subjects too numerous to mention. Then again my readers are constantly asking for special articles on different subjects of general interest, and up to now it has been impossible to satisfy many of these demands because of the limitations of our space. For example, it has been suggested by a large number of our readers that this spring we should commence a Nature Study page, and I am inclined to include this feature if many more readers ask for it. It is a good thing for boys to know something of the birds, insects, flowers, trees and the hundred and one other things that they see in their country rambles. You can help me to come to a decision on this matter by sending a postcard stating whether you would welcome short illustrated articles on these lines, or whether you would prefer they were omitted. Address your post card to "Nature Study," *Meccano Magazine*, Liverpool, and send it before 31st December.

Increase in Price

Obtaining the "M.M."

Our January issue will be published on the 1st of the month, and in accordance with the above announcement, the price will be 3d. In future, the subscription rates for the Magazine mailed direct from this office will therefore be 2/– for six and 4/– for twelve issues. These rates will include the extra postage when this is necessary owing to the postage on any particular issue exceeding the charge of 1d. that is included in the above subscription rates. The new subscription rates for copies mailed direct will come into force from to-day's date. We shall keep faith with our existing subscribers, however, and execute all orders on our books at the old rates until the subscriptions expire. This remark does not apply to the present Christmas Number, for which each subscriber will be debited 4d. including postage, a fact that should be taken into account by subscribers when renewing their subscriptions, and they should include the extra penny with their remittance. As most of my readers know, the "*M.M.*" may be ordered from all Meccano dealers, and also from any newsagent or bookstall (price 3d.). If any reader has any difficulty in obtaining supplies from one or other of these sources he should write to me giving particulars and the name and address of his dealer or newsagent, when I will take up the matter on his behalf.

The Growing "M.M."

It is very interesting at the end of the year to look back on the progress that the "*M.M.*" has made during the past twelve months, and also to compare this Christmas issue with the corresponding issues of a few years ago. As some of my readers remember, publication of this Magazine commenced in 1916 with a single sheet of four pages. I well remember the chorus of approval that heralded its appearance, and for many weeks thousands of letters came in day after day from enthusiastic Meccano boys. For some years the "*M.M.*" continued on these lines, for the war-time high cost of paper and printing made it impossible to enlarge it during this period, and indeed production at all was very difficult. In 1920 things became a little easier, however, and in September of that year we increased the number of pages to eight. Two years later the size was again increased, this time to 12 pages, and in July 1923 we permanently increased it to 16 pages and commenced a series of coloured covers. We thought that we had achieved something considerable when we increased the number of pages to 16, but as we intimated at the time, we did not intend to stand still. Since then there has been gradual increase in the size of the Magazine, until we reached our "high-water mark" with the November issue of 48 pages. The present special Christmas issue has exceeded even this, however, and consists of no less than 72 pages!

How Readers May Help

The increase in the number of our pages is largely made possible by the inclusion of advertisements, and many of our advertisers have found that the "*M.M.*" brings them more replies and orders than any other Magazine. One advertiser in many boys' papers has gone as far as to say that last month the orders he received in response to his advertisements in the "*M.M.*" exceeded the combined orders from all the other Magazines in which he advertised! This splendid result is only to be expected, and I feel sure that Meccano boys will support the "*M.M.*" and that, all things equal, if they wish to purchase any article, they will certainly purchase it from an advertiser in the "*M.M.*" rather than from outside firms, provided that price and quality are comparable. Now, in order that our advertisers may realise the value of their advertisements in the "*M.M.*" it is very desirable that all readers when replying or ordering goods, should state that they "saw the advertisement in the '*Meccano Magazine.*'" Thus they will support me and also show advertisers the value of the "*M.M.*" as a means of bringing enquiries or selling their goods. This, in time, will bring in more advertisers and additional revenue, and that will enable me to enlarge the Magazine even further. Apart from our regular features, the number of advertisements largely determines the size of each issue.

All About Pulleys

Important Labour and Energy-saving Appliances

PULLEYS play such an important part in engineering appliances and operations that a knowledge of the principles upon which they work is essential for every engineer, whether professional or amateur. The importance of pulleys lies in the fact that, when scientifically employed, they make possible a great saving of labour and energy.

A pulley consists of a circular wheel, or "sheave," of metal or wood, revolving on an axle. Its circumference is grooved to take a rope or wire, and it is supported and held in position by means of a wooden or metal framework, known as a "block." A strong hook is attached to the foot or the head of the block to enable the block to be hung up or to carry the weight to be lifted. Wooden blocks and pulleys are not in common use except on ships, where they are used for loading or unloading cargo and for various other purposes. In this case the pulleys are exposed to all kinds of weather and under these conditions wood is found to be preferable to metal.

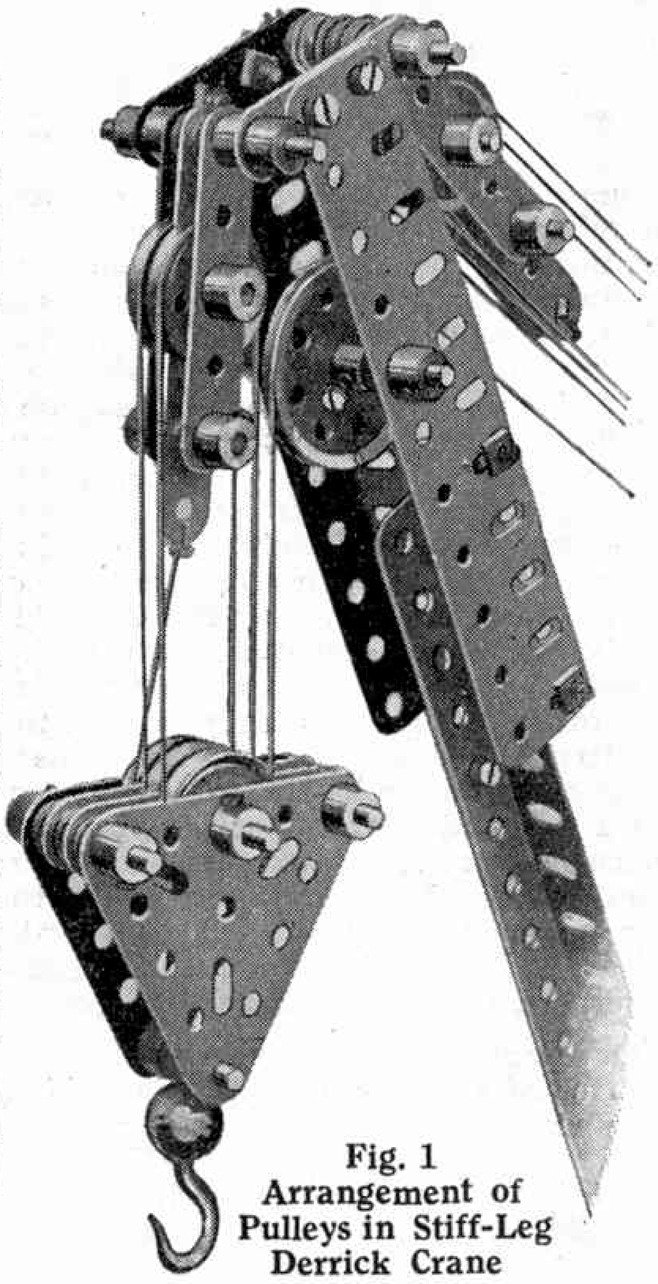


Fig. 1 Arrangement of Pulleys in Stiff-Leg Derrick Crane

Pulling Power Exceeds Lifting Power

It is a well-known fact that a man can pull with far greater strength than he can lift. Therefore if a man has to raise a 100 lb. weight to the top of a building he can pull it up more easily than he can lift and carry it up.

In actual practice a pulley must be employed in order to pull up the weight. The block containing the pulley is made fast to an overhanging portion of the roof or to a scaffolding, and a rope is passed (or "rove") through it. To one end of the rope is lashed a hook and upon this is hung the weight to be raised. The man pulls on the other end of the rope, which is called the "running" end.

If a pull of 100 lb. is now exerted by the man the weight will be exactly balanced. If he decreases his pull by even a few pounds the weight will descend, while if he increases it the weight will rise. Therefore it is clear that (ignoring friction) with one pulley the power to raise a weight must be greater than the weight itself. In fact, the pulley acts in a similar manner to a scale that balances exactly when the weights in each pan are equal. In this case the pressure on the beam carrying the pulley will be twice the weight of the load, for it has to support the pull exerted by the man as well as the weight of the load itself. Fig. 7 illustrates this single-pulley arrangement.



Fig. 2



Fig. 3

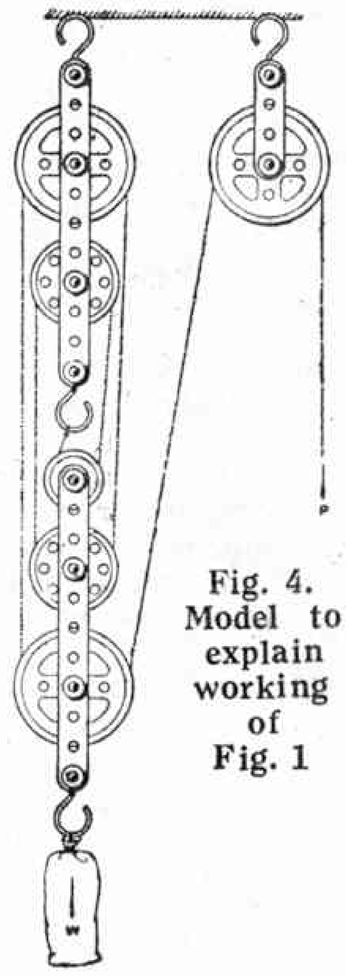


Fig. 4. Model to explain working of Fig. 1

Supposing now the weight to be moved is much larger, say 200 lb. The effort required to haul up this weight will be double that required to raise a weight of 100 lb., or, if for convenience we regard 100 lb. as the maximum pull for one man, then we shall have to engage two men to raise the 200 lb. By a little arrangement of the tackle, however, the work can still be done by one man.

200 lb. Lifted by Pull of 100 lb.

We already have our pulley fixed to a beam and our only additional requirement is another pulley as shown at B, Fig. 8. It will be seen that our second pulley, unlike the first, is moveable. The rope is made fast to the cross beam, passed under the moveable pulley B, up over the fixed pulley A, and then down to the ground. If the man now hauls on this running end he will have to exert a pull of only 100 lb. to lift the 200 lb. load. The reason for this is that the weight is now being supported by two cords, "b" and "c," and the strain on each must be the same, that is 100 lb. The result is that a man pulling on the rope "a" need only exert a pull of 100 lb. to lift a 200 lb. load.

In such a case we say that the "mechanical advantage" is two, because the pulley enables a weight of 2 lb. to be lifted by an applied force of 1 lb. It must be borne in mind, however, that the man is not lifting the weight as quickly as if the rope were passing over a fixed pulley, and as a matter of fact the load travels at only half the speed.

Effect of Three Pulleys

The arrangement we have just described is quite useful, but even better results may be obtained by a further rearrangement of our apparatus. We will now use an additional pulley and substitute separate cords for the previous continuous single cord. In Fig. 9

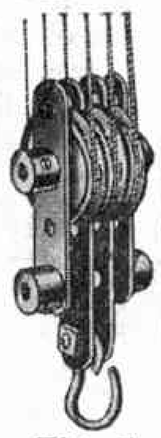


Fig. 5

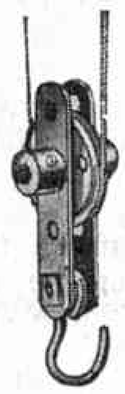


Fig. 6

one end of the outermost cord is attached to D, and the cord then passes over the pulley A, which is bolted to the upper framework. The other end of this cord is fixed to the hook on the block B. The centre cord is also fastened to D and then passes over the pulley B to be secured to the hook of the block C. The remaining cord passes over the pulley C, and is led downward to serve as the running or pulling-end of the tackle.

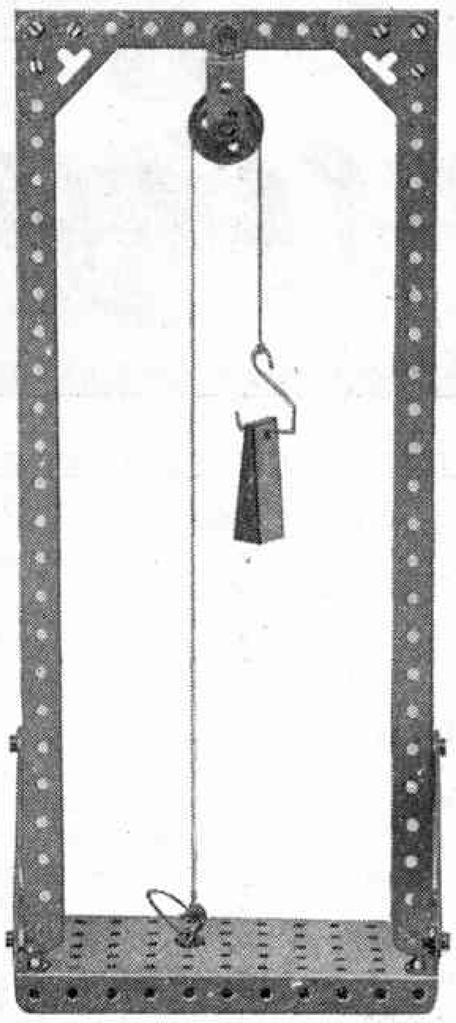


Fig. 7

If now we hang a weight of, say, 70 lb. on the hook attached to D, we find that a pull of only a little more than 10 lb. is necessary to balance the weight. Theoretically a force of exactly 10 lb. would be required, but in practice a little more force has to be applied on account of the friction set up in each pulley. This arrangement of cords and pulleys, though more powerful than the continuous cord system, is seldom used by engineers for the reason that the continuous cord system is much more convenient to fix and use.

Pulleys on Stiff-Leg Derrick

The most popular arrangement of pulleys is well illustrated in the Meccano Model No. 709, Stiff-Leg Derrick Crane. As shown in Fig. 1, the tackle here consists of a continuous cord and two blocks. The upper block is fixed and contains two sheaves or pulley wheels, while the lower or moveable block has three sheaves. The end of the cord that passes through the large pulley in the jib of the crane is the running-end.

In order to understand more clearly the relative arrangement of the sheaves and cords we will make use of the model shown in Fig. 4. The number of blocks and sheaves is the same in this model, but instead of all the sheaves in one block being on the same axle they are separated one from the other. The action of the pulleys in Fig. 4 is exactly the same as in the Stiff-Leg Derrick.

For instance, if we hang a 60 lb. weight on the crane-hook the tension on each of the cords will be the same throughout the entire tackle. In this case the tension will be 10 lb. on each cord. This amount is arrived at by counting the number of cords that spring from the lower or moveable pulley block to the fixed upper block. As there are six cords in our crane, then six times the strain on each rope will equal the weight, and as this weight is 60 lb., we know that the strain per rope must be 10 lb. Therefore, it is clear that only a force of 10 lb. is required to balance the 60 lb. load, or in other words the mechanical advantage in this arrangement is six.

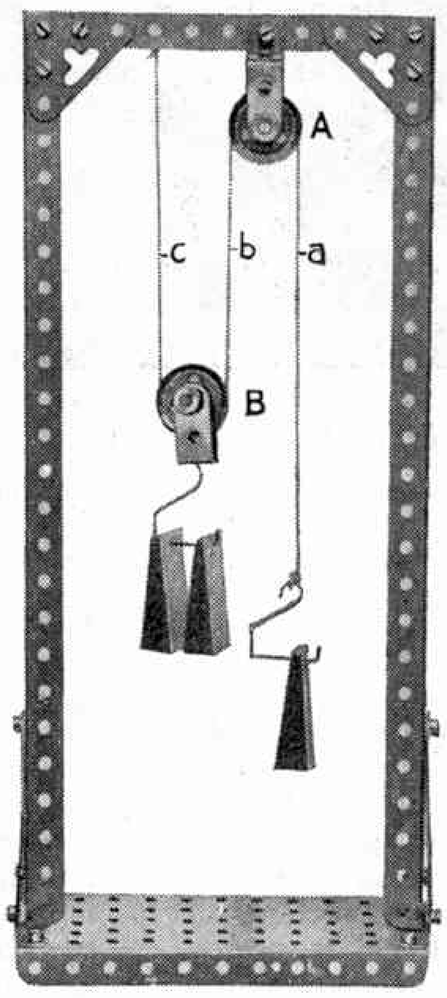


Fig. 8

Part Played by Fixed Block

The foregoing method of reducing the amount of exertion required to lift any particular weight is well illustrated in the arrangement of pulleys shown in Fig. 10. In this case a continuous cord is again used, with two blocks, one fixed and the other moveable, each containing two sheaves.

If we hang a weight of, say, 80 lb. on the hook of the moveable lower block, the force required to balance it will depend upon the number of cords from the lower block to the upper block. As there are four cords from the lower block, then the force required will be one-quarter of the weight, that is 20 lb. The examples we have given in this article should have made it clear that in order to gain any mechanical advantage more than one pulley must be used. It should be noted that a fixed pulley confers no mechanical advantage, and therefore has no effect on lessening the amount of force required to lift a load. The value of the fixed pulley lies in its ability to change the direction of the pull of the applied force so that it can be directed downward.

Types of Meccano Tackle

Figs. 2—6 show four types of tackle used in Meccano models. Figs. 2, 3 and 6 are types of single pulley tackle. One end of the cord is secured to the tail of the standing block and the other end is rove through its pulley and leads down as the running or hauling-end. In each of these three arrangements the mechanical advantage is two, that is to say a 100 lb. weight can be lifted with a force of 50 lb.

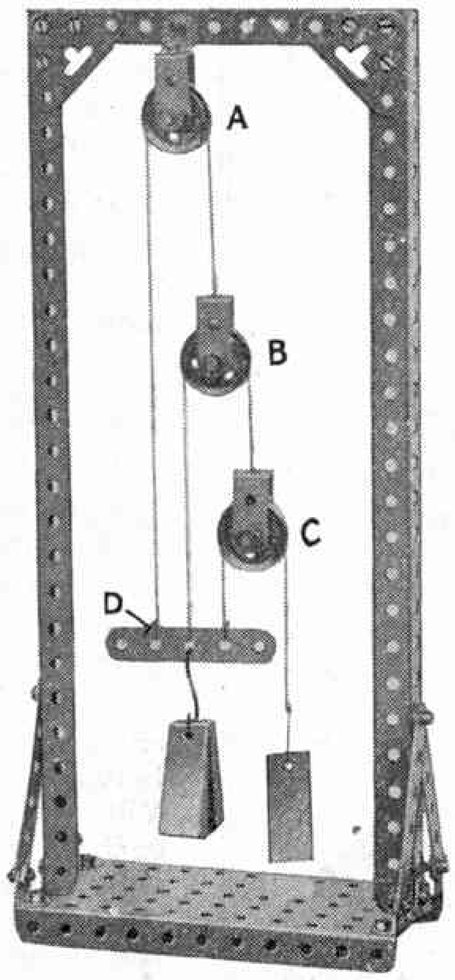


Fig. 9

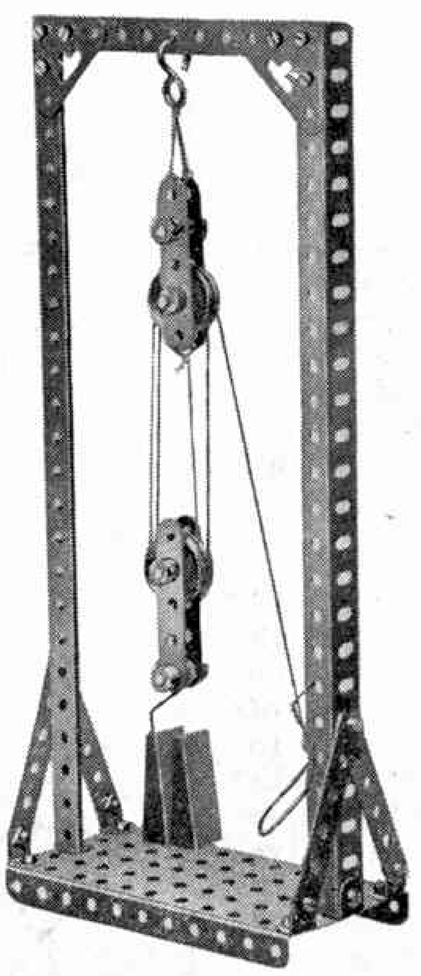


Fig. 10

In the arrangement shown in Fig. 5 each block contains three sheaves, and the running end is led down from an end-sheave of the fixed top block. In this case the mechanical advantage is six, or in other words a weight of 60 lb. can be balanced by a force of 10 lb.

The Meccano models shown in Figs. 7–10 are very easy to construct, and an hour spent in experimenting with them will give a really practical idea of the operation of pulleys.



Lives of Famous Engineers

TELFORD
BRIDGES, ROADS AND CANALS
XI

Last month we saw how Telford rose to a position of eminence among civil engineers by a combination of natural ability and hard work. This month we follow him further on his upward career and see something of the wonderful manner in which he overcame the great difficulties involved in the construction of the Ellesmere and Caledonian Canals.

ON his return to Shrewsbury after inspecting the fine buildings in London and the chief towns in the West of England, Telford intended to proceed with the study of architecture while carrying on his work as surveyor. Before long, however, the direction of his activities was changed by his appointment as engineer to the Ellesmere Canal Company. This new post brought him the sum of £500 per year, out of which he had to pay a clerk and a foreman in addition to his own travelling expenses.

The Ellesmere Canal

The Ellesmere Canal consisted of a series of navigations joining the River Dee to the Mersey and the Severn, the total length, including the Chester Canal, being about 112 miles. The success of the Bridgewater Canal constructed by Brindley had aroused general interest in the opening-up of inland navigations and no difficulty was experienced in obtaining financial support for this new project. The Act of Parliament authorising the construction of the canal was passed in 1793 and Telford commenced operations in October of that year. As regards masonry work he felt himself competent to deal with all difficulties, but as he had had little experience of earthwork, and none at all of canal-making, he obtained advice on these matters from Mr. William Jessop, an eminent engineer of that day.

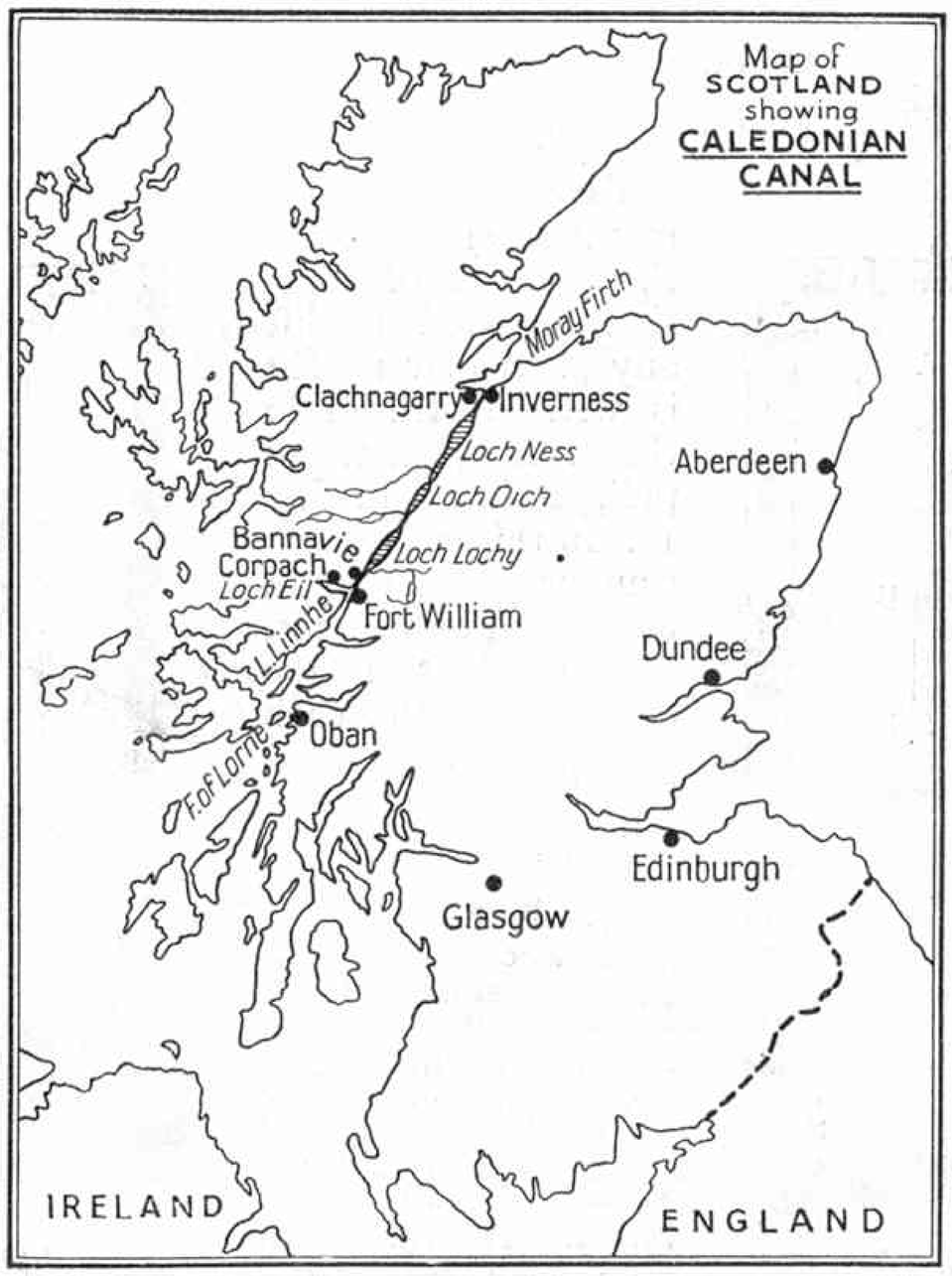
Two Great Aqueducts

The most difficult portion of the canal to construct was that through the rough hill-country between the Rivers Dee and Ceriog, in the vale of Llangollen. The only alternative to building numerous and costly locks was to carry the canal on the same level from one side of the respective valleys of the Dee and the Ceriog to the other, and this was accomplished by constructing the fine aqueducts of Chirk and Pont-Cysylltau. In these aqueducts Telford broke away entirely from the methods of Brindley in regard to carrying the water. This new construction and the reasons for its adoption are well described in Telford's own words :—

"Previously to this time such canal aqueducts had been uniformly made to retain the water necessary for navigation by means of puddled earth retained by masonry; and in order to obtain sufficient breadth for this superstructure, the masonry of the piers, abutments, and arches was of massive strength; and after all this expense, and every imaginable precaution, the frosts, by swelling the moist puddle, frequently created fissures, which burst the masonry, and suffered the water to escape—nay, sometimes actually threw down the aqueducts; instances of this kind having occurred even in the works of the justly celebrated Brindley. It was evident that the increased pressure of the puddled earth was the chief cause of such failures: I therefore had recourse to the following scheme in order to avoid using it. The spandrels of the stone arches were constructed with longitudinal walls, instead of being filled in with earth, and across these the canal bottom was formed by cast iron plates at each side, infixed in square stone masonry. These bottom plates had flanches on their edges, and were secured by nuts and screws at every juncture. The sides of the canal were made water-proof by ashlar masonry, backed with hard burnt bricks laid in Parker's cement, on the outside of which was rubble stone work, like the rest of the aqueduct. The towing path had a thin bed of clay under the gravel, and its outer edge was protected by an iron railway. The width of the water-way is 11 ft.; of the masonry on each side, 5 ft. 6 ins.; and the depth of the water in the canal 5 ft.

"By this mode of construction the quantity of masonry is much diminished, and the iron bottom plate forms a continuous tie, preventing the side-walls from separation by lateral pressure of the contained water."

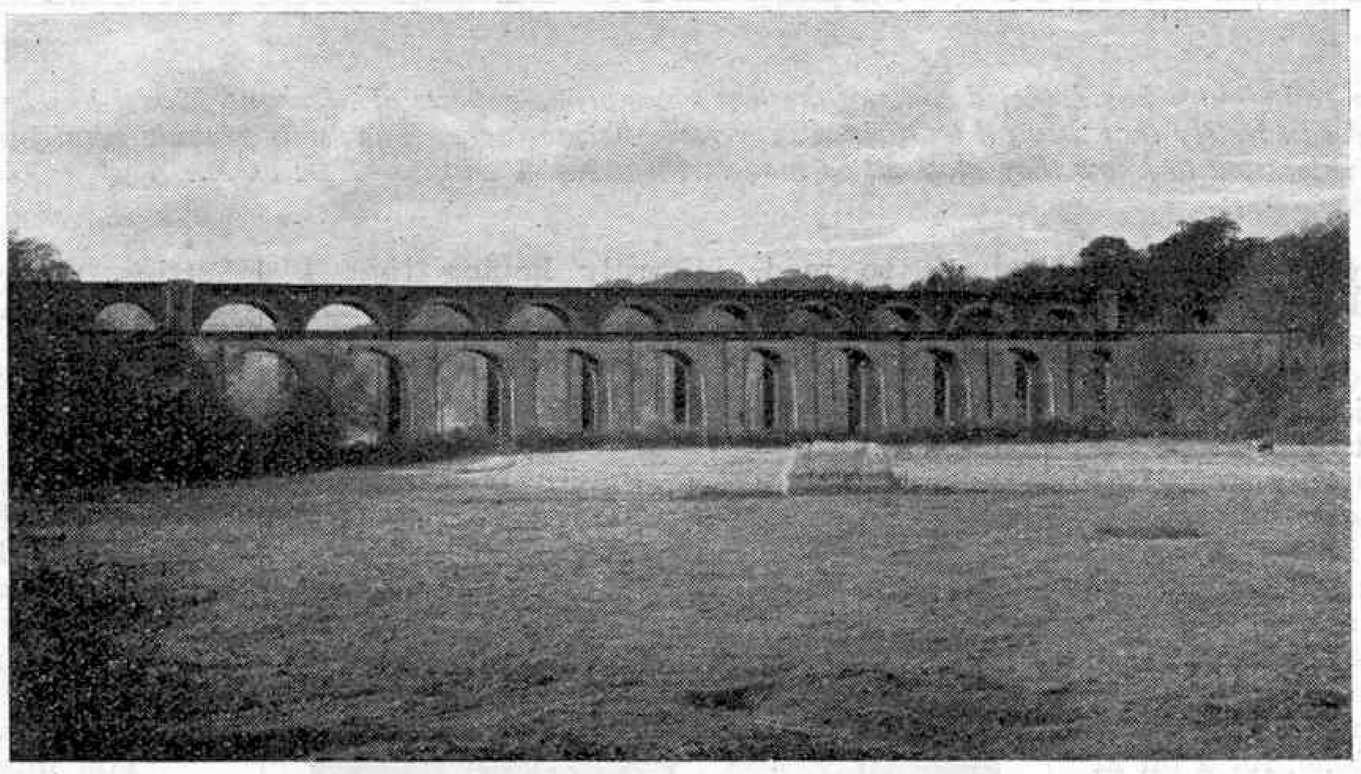
The Chirk and Pont-Cysylltau aqueducts thus consisted of masonry surmounted by a cast iron trough with towing path and side rails, in place of a puddled trough as used by Brindley in his Barton aqueduct. The Chirk aqueduct carried the canal across the valley of the Ceriog between Chirk Castle and Chirk Village. This consisted of ten arches each of 40 ft. span, the level of the water in the canal being 65 ft. above the meadow below and 70 ft. above the level of the River Ceriog. The piers were carried up solid to a certain height, and above this they were built hollow with cross walls.



Map showing the Caledonian Canal

The spandrels above the springing of the arches were constructed with longitudinal walls and left hollow. The first stone was laid in June 1796 and the work was completed in 1801.

The Pont-Cysylltau aqueduct was of even greater dimensions, and Sir Walter Scott spoke of it as the most impressive work of art he had ever seen. It was situated about four miles to the north of Chirk at the crossing of the Dee, and it was carried across the valley on piers supporting 19 arches, extending for a length of 1007 ft. The height of the piers above the low water in the river was 121 ft. The lower part of each pier was built solid for 70 ft., all above being hollow, and the outer walls of the hollow portion were only 2 ft. thick, with cross inner walls. The foundation stone of this aqueduct was laid in July 1795 and the work of construction occupied nearly eight years.



Chirk Aqueduct, with the Viaduct beyond

A Visit to Eskdale

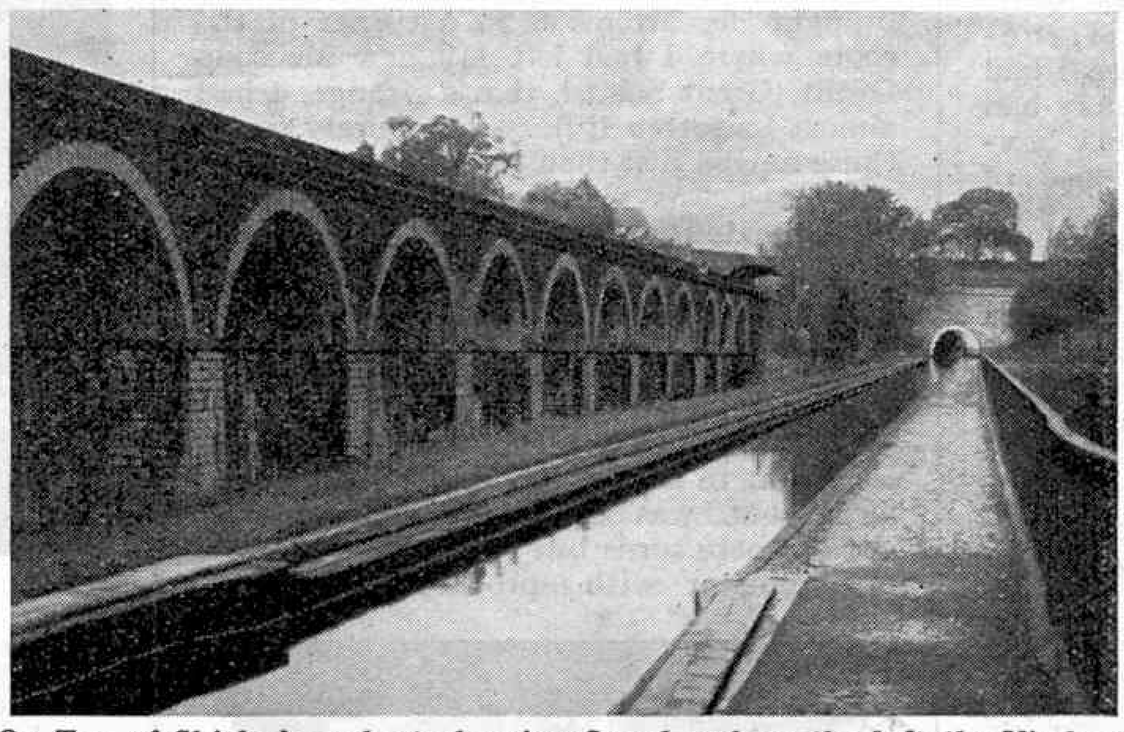
During this period of his career Telford carried out a long-planned visit to his native Eskdale to see his mother, who was now old and infirm. He had never ceased to take care that she should want for nothing, and he had regularly sent money to a friend at Langholm to be laid out in little comforts for her. On this visit he found her alive, but only just so, and all he could do was to ensure that her few remaining wants were properly supplied. He took the opportunity of calling upon some of his old friends at Langholm, among them being a former fellow-workman, now become an innkeeper. Telford asked his old friend what he had done with his mallet and chisels, and was told that they were all dispersed and perhaps lost. "I have taken better care of mine," replied Telford. "I have them all locked up in a room at Shrewsbury, as well as my old working clothes and leather apron; you know, one can never tell what may happen!"

Telford's First Iron Bridge

Telford had long been convinced of the numerous possibilities of cast iron for bridge building, and he took an early opportunity of putting his ideas into practice. The first attempt to build a cast iron bridge was made at Lyons in 1755. This attempt was abandoned, however, on the ground of expense, timber being used instead, and the honour of actually completing the first iron bridge belongs to England. Not long after the Lyons project had fallen through it was decided to build a bridge over the River Severn near Broseley, and John Wilkinson, the first of the long line of great ironmasters, strongly urged that iron should be used for its construction. After considerable discussion his suggestion was adopted and the scheme was carried out in 1777. This bridge, which consisted of a single arch of 100 ft. span, had many defects of design, but nevertheless it proved a very serviceable structure.

The second iron bridge in England was that across the River Wear at Sunderland, built in 1796. Its span was 236 ft. and its height was great enough to allow large vessels to pass beneath it without striking their masts. This bridge was in many ways a remarkable piece of work and Robert Stephenson spoke of it as "a structure which, as regards its proportions and the small quantity of material employed in its construction, will probably remain unrivalled."

Telford's first iron bridge was built in 1796 across the river Severn at Buildwas, between Shrewsbury and Bridgnorth, to replace the old bridge which had been swept away by a great flood in the previous year. It was a handsome structure consisting of a single arch of 130 ft. span, and it served successfully, until 1906, when it was pulled down and replaced by a wider structure.



On Top of Chirk Aqueduct, showing Canal and, on the left, the Viaduct

A Daring Proposition

Telford also erected several iron road bridges and he attained such confidence in the possibilities of iron that in 1801, when it was found necessary to re-build or remove Old London Bridge, he proposed the daring scheme of a cast iron bridge of a single arch of 600 ft. span, having a clear headway of 65 ft. above high water. The boldness and the originality of this design were greatly admired, but before anything was done it was decided to submit the scheme to the most eminent experts of the day, after which evidence was taken before a Select Committee. The committee seem to have agreed that the design was practicable and safe and preliminary works were actually begun, but eventually the scheme was abandoned, apparently owing to the difficulty of constructing the approaches to a bridge with such a headway.

During this stage of his career, Telford also erected a number of important stone bridges. Among these was the handsome bridge across the Severn at Bewdley in Worcestershire. This structure had three arches, one of 60 ft. span and two of 52 ft., and land arches of 9 ft. span were provided at each end for the passage of flood water. Another noteworthy bridge of this period was the Tongueland Bridge over the River Dee in the county of Kirkcudbright.

Telford's life at this time was extremely busy, involving a great amount of travelling about, and in a letter to a friend he speaks of himself as being tossed about like a tennis ball. At the same time he still managed to find time for reading and even for writing poetry, and this was undoubtedly an excellent form of relaxation for a man whose mind was full of bridges and viaducts.

Recommends Improvements in Scotland

In the year 1802 Telford was called upon by the Government to make a survey of Scotland and to report upon the measures necessary to improve the roads and bridges, and also to promote the fisheries on the East and West coasts. His report was duly presented and it formed the basis of a great scheme of development, especially in regard to the Highlands, where the absence of roads and bridges was a very serious handicap to progress of any kind. The effect of his report was such that in 1803 a Parliamentary Commission was appointed and a series of improvements was commenced. These resulted in the construction of over 900 miles of roads and bridges throughout the Highlands, half the cost being defrayed by the Govermnent and half by local assessment.

One of the most important of the new bridges constructed under Telford's supervision was that over the River Tay at Dunkeld. This occupied three years in the building and was open for traffic in 1809. It was a handsome structure of five river and two land arches. The span of the two centre arches was 90 ft. and that of the two adjoining ones 84 ft. Its cost was about £14,000, half of which was defrayed by the Duke of Atholl.

Another noteworthy bridge was built by Telford across the River Spey at Craig-Ellachie, where the river had formed a deep channel 50 yds. in width. The

(*Continued on page* 415)

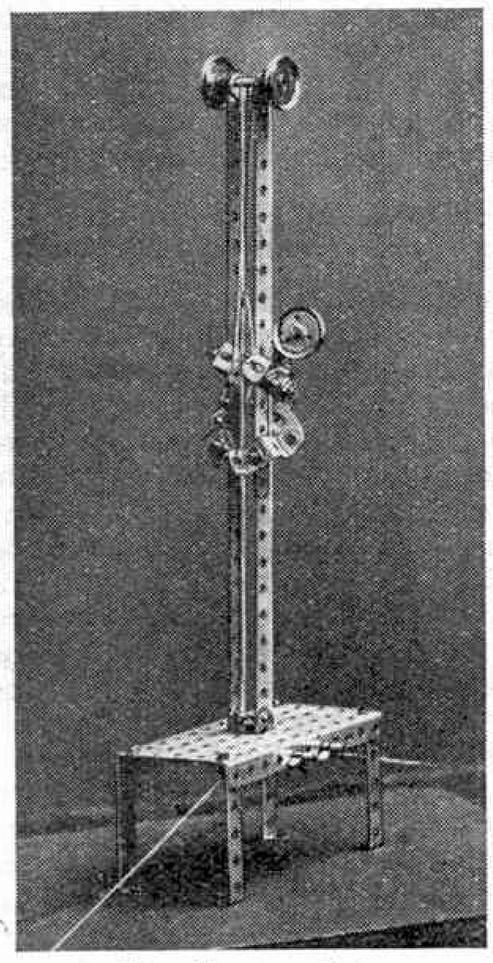
Discoveries in Meccanoland

By W. M. Manning

In this article our contributor has depicted some of the more humorous aspects of Meccano Model-building. We have built all the models illustrated, and can testify that they all work in a very realistic manner. They will provide great fun this Christmas, and our young readers will be interested to know they may all be made with a No. 1 Outfit.—EDITOR.

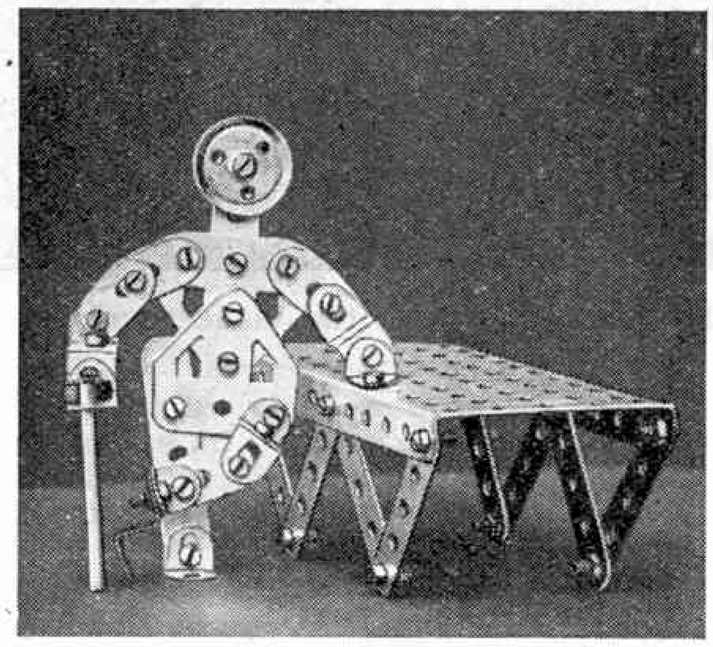
TO put it very plainly, I was feeling "fed-up." Yesterday was Christmas Day and we had had a rousing good time, but to-day, for some strange reason or other, I was decidedly off-colour. I had already explained to lots of people that I had been over-working myself at the school exams., but why my brother Jack should have chipped-in just then with something about "too much Christmas pudding or too many mince-pies, you mean!" I cannot imagine! Anyway, the rest of the family were enjoying themselves in the drawing room, but I just felt that I wanted to be left alone, for a bit at any rate!

As I wandered aimlessly about, the quietness of the house seemed most depressing after last night's noise and excitement. Dolls, books, and toys still lay about the room, although it seemed an age since yesterday when I had taken the part of Santa Claus. I had told them I could do this quite well, because I had already had some experience of acting at school. It really was unkind of Jack to remind the family of the quite unnecessary fact that my *debut* on that occasion had been in quite a minor part—as one of the sheep in the school pantomime, "*Little Bo-Peep*," in fact! As it was, things were dead against me as Santa Claus, although I admit I was to blame to a certain extent in not discovering until after I had entered the room that my "beard" was growing somewhere round my right ear! Even then I think I should have passed it off all right if that ass Bobbie had not stepped on my toe. Pauline told me later that when I asked the "silly cuckoo" to mind where he was going she knew at once I couldn't be the *real* "Father Chwissmas." But then Pauline is very young, and never had much imagination!



The Greasy Pole

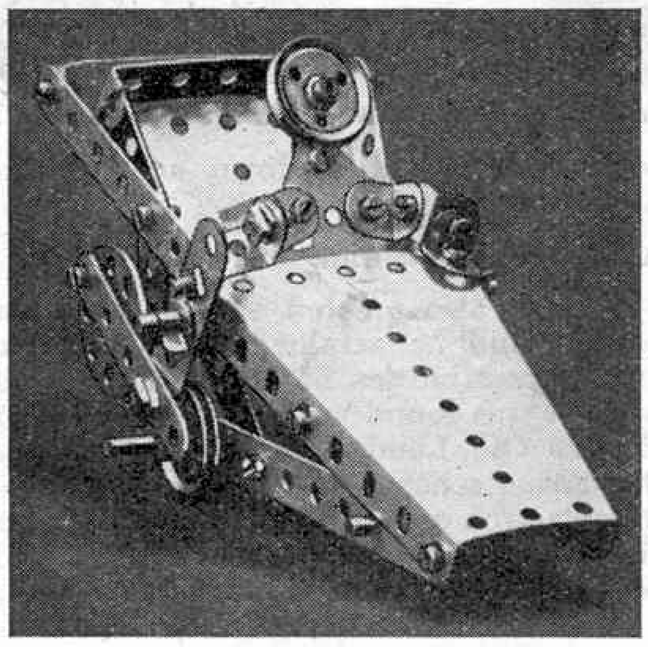
Well, all that happened yesterday, and here I was in a very different frame of mind! I sighed heavily and hunted round for a book to read, inwardly hoping that I should feel better to-morrow. Picking up a fine volume that my uncle had given me, "*Gulliver's Travels*," I drew my chair close to the fire and was soon deep in its pages.



King Meccano

I cannot say how long I had been reading, but I remember that Gulliver had returned safely home from his adventure with the Lilliputians, and I had laid the book down for some minutes to think over what I had read. . . . A slight noise suddenly brought my attention to a corner of the room where I had left my new Meccano Outfit (Great Scott! that's strange, I had almost forgotten it!) . . . Surely something moved just then? . . . I almost decided I was mistaken when the noise was repeated, and I again turned my eyes to that part of the room. Imagine my surprise to see a tiny but very quaint figure in shining armour standing in a somewhat defiant attitude by the side of an equally tiny table.

Doubting my senses I attempted to cross the room to investigate, but found to my alarm that I was bound to my chair—bound not by mere cords but in a very workmanlike manner with sprocket chains and



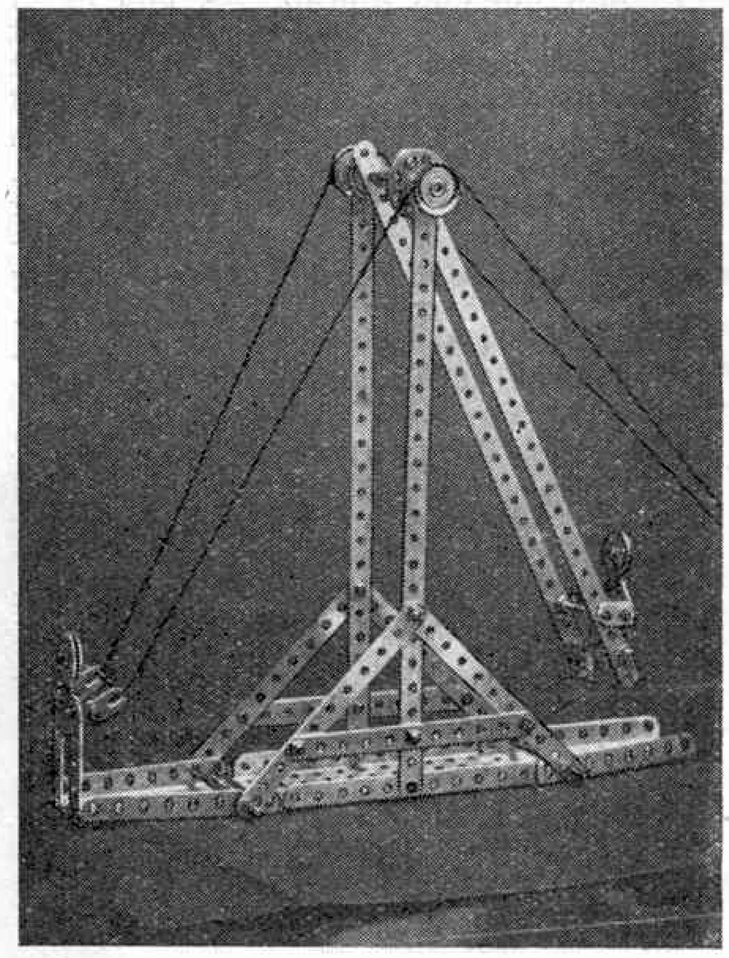
"The Oldest Inhabitant"

strips. Indeed, I was literally bolted down! Glancing again at this tiny figure I observed a queer kind of smile pass over his face. He seemed to consist of a similar kind of material to that used in my bonds, for he fairly glistened in the fire-light, and as I gazed at him I saw that his armour was pierced by a pattern of equally-spaced holes. But his head fairly fascinated me; it was a beautiful golden tint and perfectly round, as were his eyes, nose, and mouth.

I had barely taken in these details, when I was startled to hear a voice, hard and metallic, addressing me:—

"You must pardon the liberty I have taken in exerting my power over you, but as you will no doubt later agree, it is in your own interests that I should do this."

Naturally, I was annoyed at being thus addressed by so diminutive a creature, and



A Happy Time on the Swings

decided to kick him into a corner! But I could not move an inch, and except for my head I might as well have been paralysed. I began to think I must be dreaming, but everything was so real, and what was more I could feel the sprocket chain cutting into my wrists. Indeed, I came as near to having the "Wind up" as I have ever done! This diminutive creature certainly seemed to be "top-dog" for the moment, so I decided to humour him and to look out for a chance to get the better of him before any of the others came into the room to find me bolted to the chair.

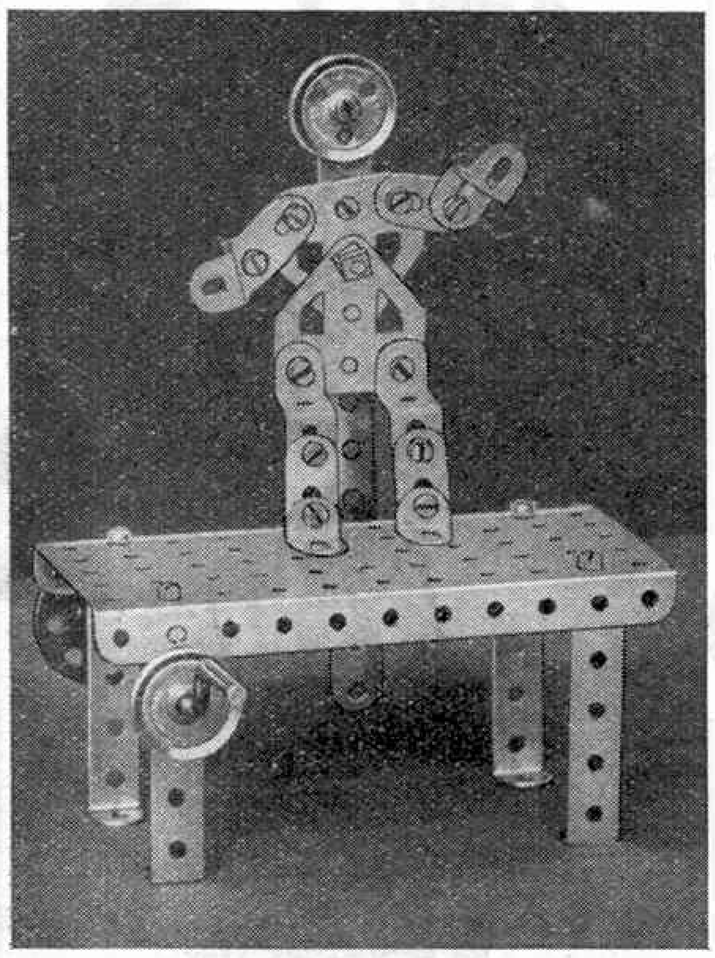
"I am the King of Meccano," he said, after a few seconds silence. "I have waited for this opportunity for a long time, but not until to-night have I been able to enter your life. I am now going

to show you some things of which I was beginning to fear you would always remain ignorant. Ho, there!" he cried, and before I could speak two tiny boys in white checked-jerseys, tumbled out from somewhere. Armed with screwdrivers and spanners, they at once commenced to loosen my shackles.

"In a few minutes I shall be free," I thought, "then I'll kick this self-styled King Meccano back into his box—and the boys too!"

But to my horror I found that, as my bonds were loosed, something was happening to me. I felt like a balloon feels when its air is slowly let out for, like Alice in Wonderland, I was rapidly diminishing in size! Smaller and smaller I became until, as my last shackle was unloosed, I had become about the same size as my strange companion, at which point my shrinking ceased, thank goodness!

[The construction of King Meccano is shown quite clearly in our photograph. In common with the other little figures on these pages he consists principally of a Flat Trunnion and 1" Pulley Wheel without set-screw. He stands upon one leg, constructed from a 2½" Strip and an Angle Bracket, while his other, which is crossed before him, consists of one Angle Bracket, one Flat Bracket and one ½" Reversed Angle Bracket].



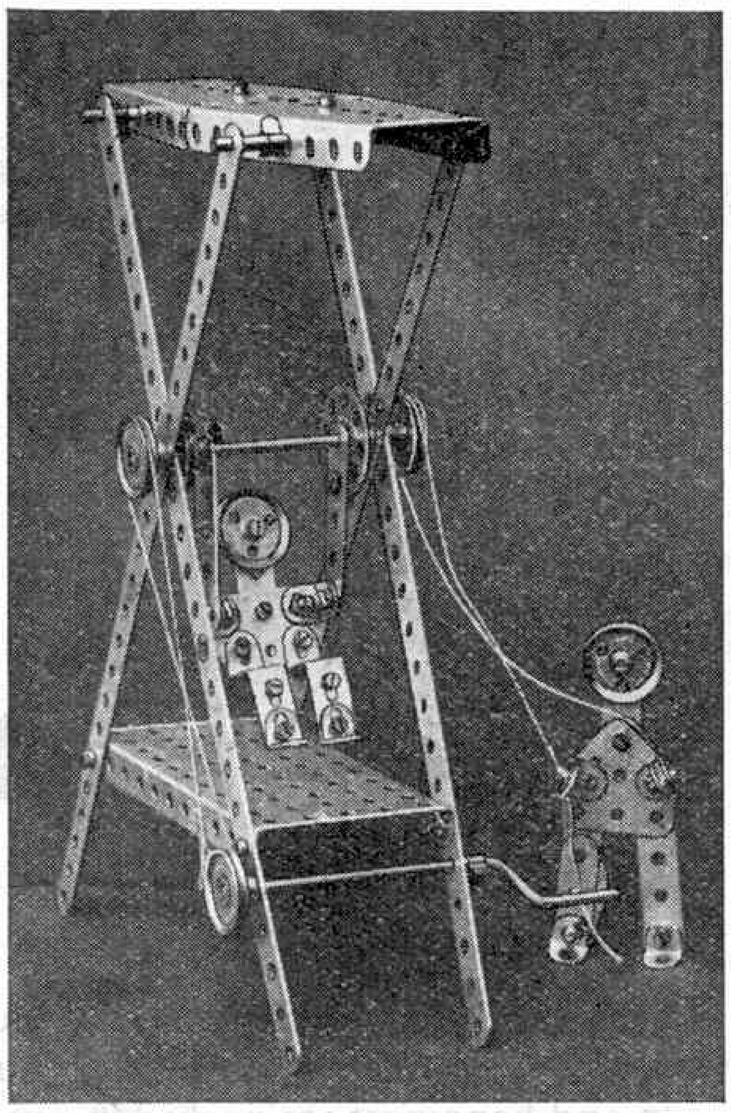
The Professor gives an Exhibition of Step-Dancing

As I drew up with a sigh of relief by his side, the King assured me of his ability to restore me to my normal size as soon as his object was accomplished. The boys, he explained, were ordinary Meccano boys who had been captured while asleep at their Outfits, for which crime they had been brought to Meccanoland to act as the King's bodyguards.

"In this capacity they are expected to learn the error of their ways, for here nobody ever sleeps. The boys seem to be enjoying themselves thoroughly. In fact," continued the King in a confidential whisper, "now they don't want to return to your world!"

Beckoning me to follow him, he threw open a tiny door in the skirting-board.

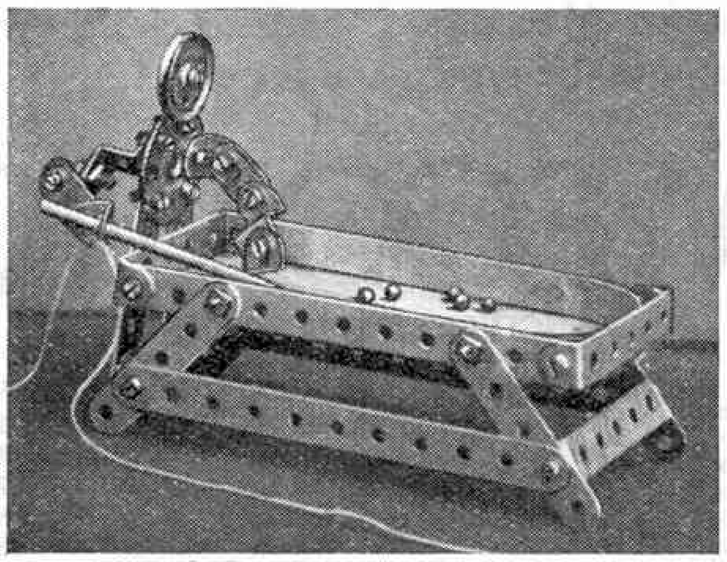
"We now enter the great realm of Meccanoland," he said, and as he spoke he seemed to glow more than ever with pride. Truly he had good cause for pride, I thought, as I stood on the frontier of the brightest and most wonderful country I have ever seen. On the plain below, prosperous-looking lands stretched away



Gymnasts on the Horizontal Bar

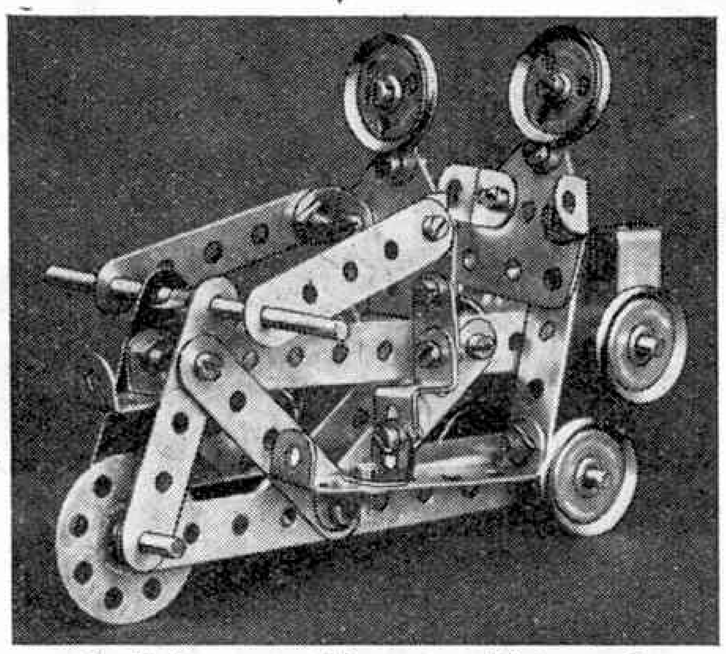
to the horizon, while close at hand were hundreds of Meccanitians, bustling about on their various occupations and presenting a scene of such activity and happiness that is seldom seen by the eyes of men.

"These wonderful lands of mine," my highly-placed guide was saying, "are rich



A Quiet Game of Bagatelle

with new ideas and great possibilities, hidden from sight and kept secret. There are now, however, over a million boys in all parts of your world who have sworn allegiance to me—although some do not know it—and this country is open to these boys. All that they require to enter it is a



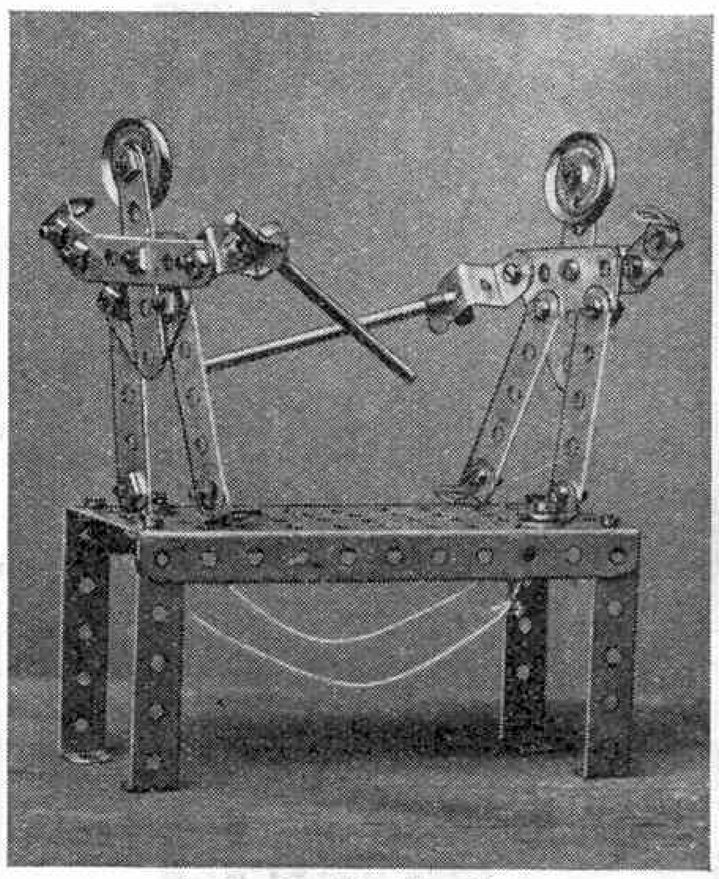
A Trip on a Meccano Motorcycle

passport, and this is a Meccano Outfit. I shall welcome any and every boy, knowing that they will make this country even more prosperous than it is to-day, for I number amongst my young friends the best and brightest boys of every nation in your world.

"Those who work and seek diligently will find hidden treasures, sometimes in most unexpected places. To let you into a great secret, I may tell you that some may even discover great treasures and great possibilities *hidden in themselves!* They will be rewarded—perhaps years later—in their life in your world, for it is there that they will reap their reward!"

I was spellbound at the prospect unfolded by the King, and as we walked in Meccanoland my amazement increased even more. We were surrounded by hosts of little people, of the same type as my companion, every one of whom seemed to be intent on cramming as much fun as possible into his or her life.

"Even the Meccanitians have their holidays, as you see," remarked the King, as we entered a great fair-ground crowded with a brilliant throng. Here was every imaginable device for amusement—Swings, Roundabouts, Helter-Skelters, Joy-wheels, and Scenic Railways—all made of shining steel and polished brass.



A Bout with the Foils

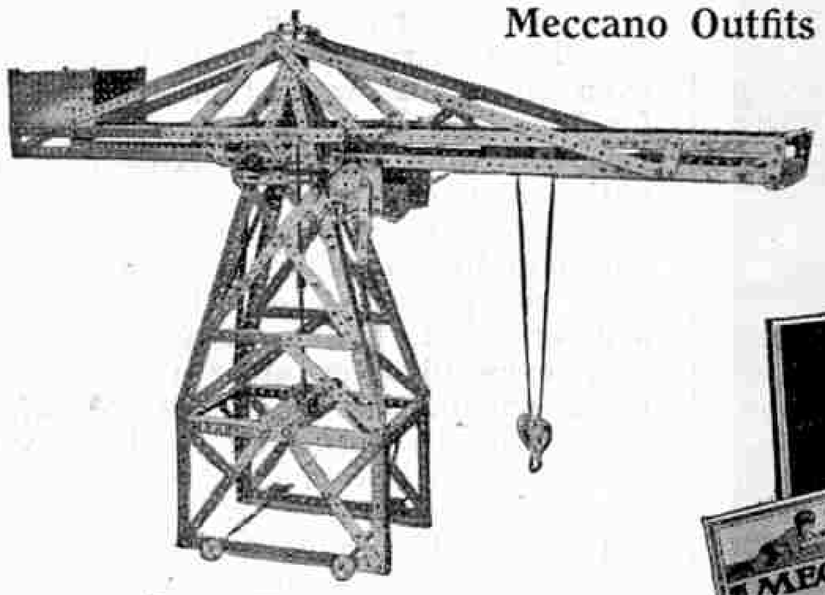
[SWING. In this model the cord seen in our illustration is passed twice round the 1" Pulleys at the top of the swing and then connected to the "hands" of the "Meccanitian," who has his feet (two Angle Brackets) inserted beneath the Sector Plate forming part of the base of the Swing. A slight pull on the other end of the cord will start the Swing, while our "Meccanitian" will rock to and fro as though he is doing all the work himself! The legs of the little fellow who gets the best fun in this model are specially made (by means of 1" Reversed Angle Brackets) to fit the Swing—perhaps this is the reason why he never gets out to give his friend a ride!]

His Majesty became more and more excited as we mingled with the crowd. Indeed, whilst watching the Greasy Pole he laughed so much each time the climber came tumbling down that his joints literally rattled and his bodyguard anxiously drew their screwdrivers in case they should be needed!

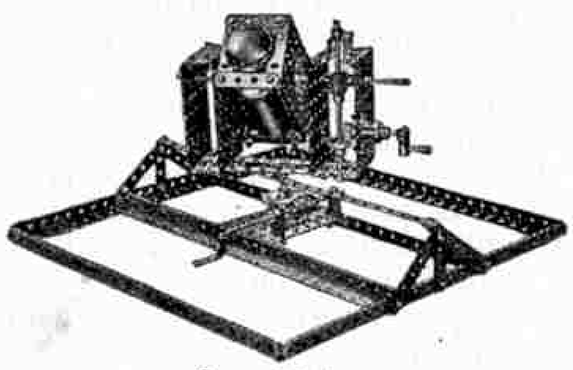
[GREASY POLE. The climber's arms and legs are loosely connected to his body, the bolts being lock-nutted. A piece of cord is connected to his hands and passed over an Axle Rod at the top of the pole, thence down through the Flanged Plate at the base. Another cord is tied to his feet and also led over the top of the pole down to the base Plate. Two 3½" Rods inserted in the latter act as guides to the cords. By operating these cords the figure

(*Continued on page* 383)

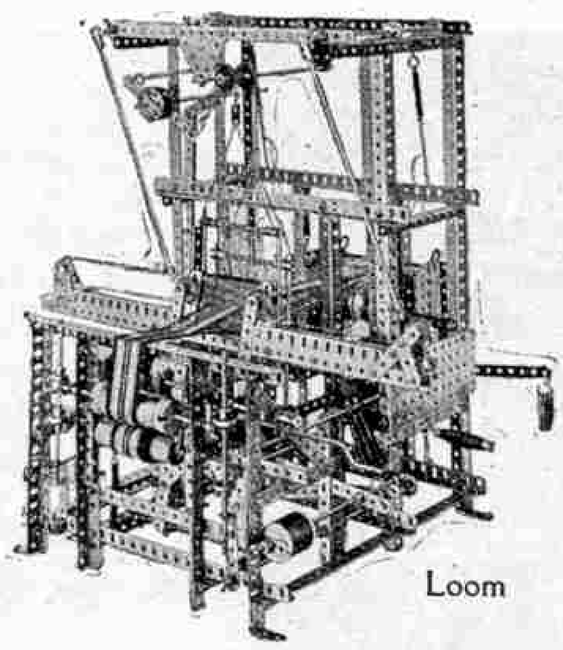
Meccano Outfits may be obtained from all leading toy stores



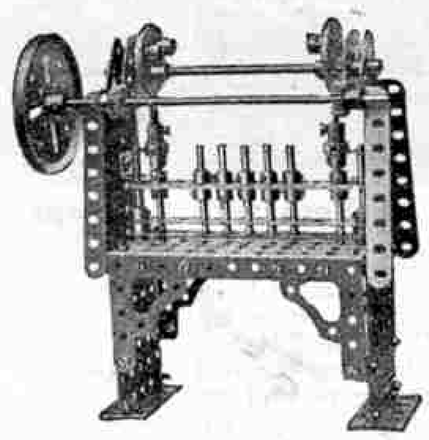
Radial Travelling Crane



Searchlight



Loom



Punching Press



Costs 40/- builds 263 models!

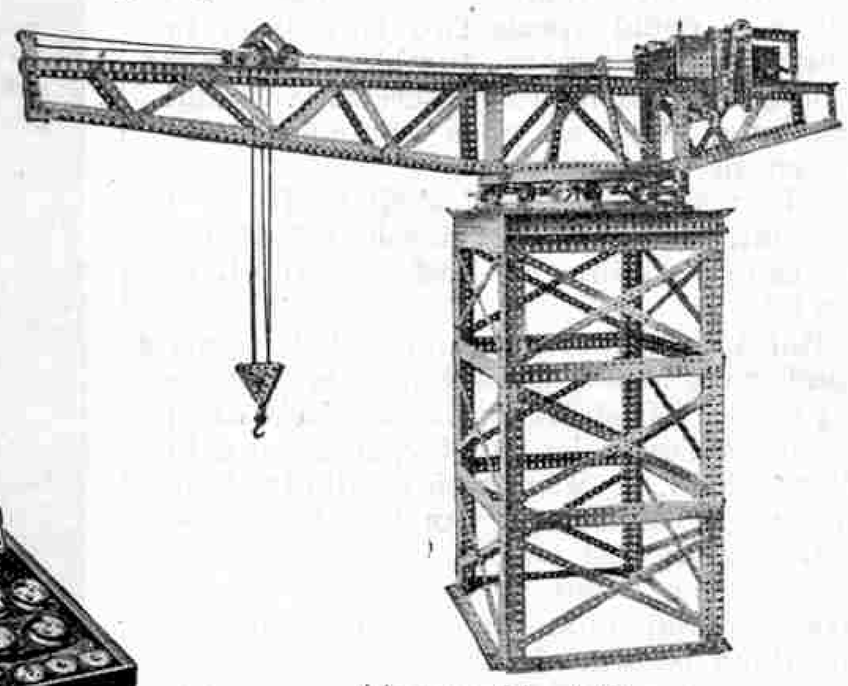
Meccano Outfit No. 4.

There is no such thing as a dull evening if you have Meccano. Hours of fun and happiness are packed in every Meccano box. The number of fascinating models any bright boy can make with even the smallest Outfits is almost endless, for when he has made those illustrated in the big Manual of Instructions he improves upon them or invents more. Meccano is indestructible—you can use the same parts for ever!

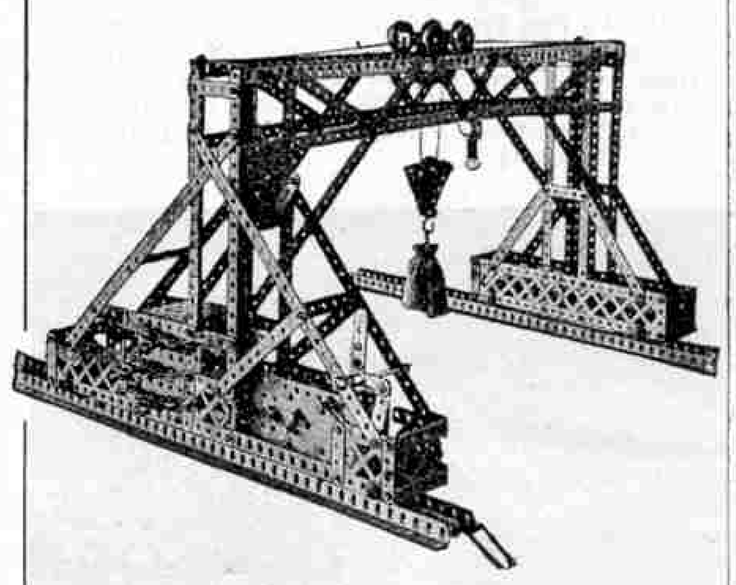
MECCANO

ENGINEERING FOR BOYS

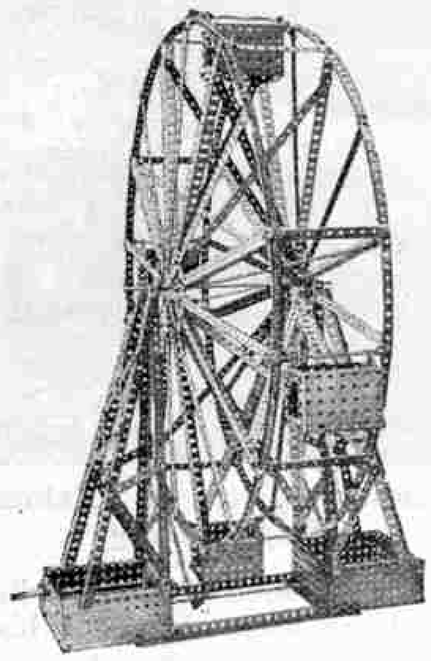
COMPLETE OUTFITS		ACCESSORY OUTFITS	
No. 00	3/6	No. 00a	1/6
No. 0	5/-	No. 0a	4/-
No. 1	8/6	No. 1a	7/6
No. 2	15/-	No. 2a	8/6
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Hammer-Head Crane



Travelling Gantry Crane



Big Wheel

Dragline

Limousine

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MECCANO LTD. BINNS ROAD LIVERPOOL



Ten Minutes Slow

AN ENGINEERING STORY.

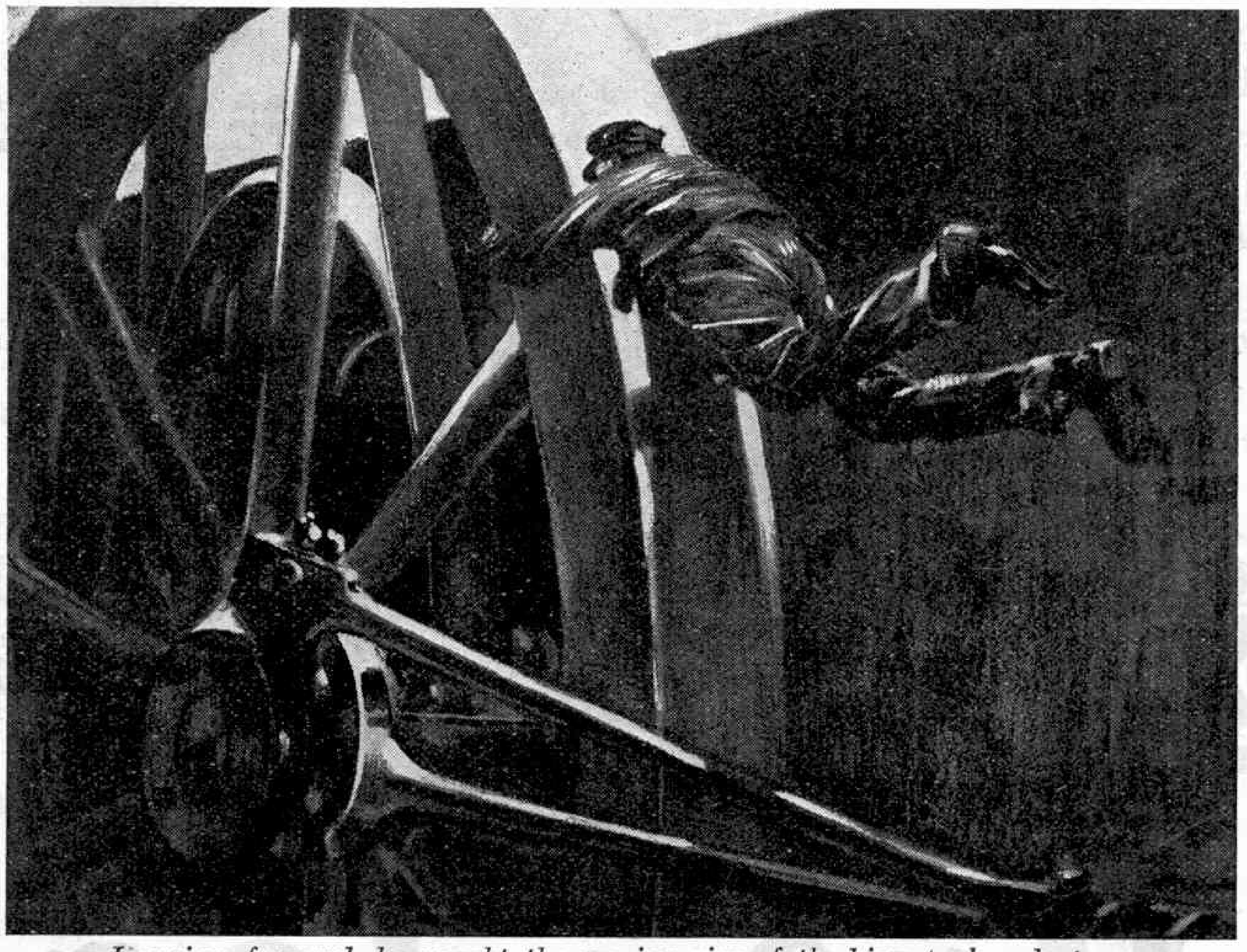
By HUGH F. GRINSTEAD*

AS Bert Kelley seated himself at the breakfast table he looked at his watch. To his surprise he found that it had run down. He wound it up, and, as he "couldn't be bothered" to go into the front room to look at the clock on the mantelpiece, he set his watch by guess at a quarter past six. Half-an-hour later, while hurrying past the Post Office on his way to work, he glanced at the big clock and found that he had set his watch ten minutes slow. "Oh, I'll just allow ten minutes when I look at it and set it right when I have more time," he said to himself as he slipped the watch back into his pocket.

Bert was employed as extra fireman and general helper in the engine room of the big smelting works where copper ore was crushed and the metal extracted and cast into bars. He arrived at the works just as the whistle blew and was kept busy until mid-day. In fact he had been so busy that he had not as much as looked at his watch all the morning. When he went out to luncheon at a neighbouring restaurant the fact that the watch was slow had passed completely from his mind.

On the way back to the works after dinner Kelley glanced at his watch and found that he had almost twenty minutes to spare before the whistle to resume work would blow. It was his duty every day, while the machinery was at rest, to oil the crank by the side of the massive flywheel, and he determined to set about it at once.

The engine furnished the power for the stamping machines and was of an old type with a flywheel sixteen feet in diameter, a rim of smaller diameter bolted to the big wheel carrying the driving belt. A cement-lined pit accommodated the lower part of the flywheel while the upper part went through an opening cut in the floor over the engine room and rose two feet above it. The opening was three feet wide and approximately seventeen feet long, and the driving belt ran up through it to the pulley on the shafting that ran along the ceiling.



Leaning forward, he caught the moving rim of the big wheel and at once he was pulled off his feet

The plant, which was situated on a steep hillside, had not been built for its present use, and because of that and of its position against the hillside many of the arrangements were not what they should have been. The engine base, for example, had been set higher than the boiler room, because it could not have been set in any other manner in the circumstances.

The crank to be oiled could only be reached from the wheel pit, and Bert, picking up the oil-can and a handful of waste, went upstairs to the floor above. Grasping the rim of the big wheel he swung himself down to the driving wheel and then stepped on to the crank bearing. The narrow space in which he was compelled to work was virtually a covered pit. On one side of him was the flywheel; on the other was the central wall of the engine-room foundation. One end of the pit was boarded up and the connecting rod from the engine came through a small passage at the other end. The roof of the pit was so low that when standing up Bert could touch the floor above.

Before he unscrewed the cap from the oil-can he looked at his watch again. It was a quarter to one, and as his task could be accomplished in a few minutes he did not hurry over it. He busied himself in polishing the brass cup with a handful of cotton waste and in wiping off surplus oil from the bearings.

As he filled the oil cup from the can and picked up the brass cap to screw it back into place he was startled by the shriek of the whistle. "Must be nearly one o'clock," he thought, "I'd better hurry!" He gave a final turn to the cap and stood up with his feet on the squared surface of the connecting rod just behind the crank bearing.

But even as he raised himself from a sitting posture he caught a sound more sinister than the whistle. It was the hiss of steam entering the idle cylinder! He felt the machinery tremble for an instant as it responded to the force of the incoming steam . . . then the crank jerked forward slowly and imparted a barely perceptible motion to the big flywheel.

Bert suddenly realised that the engine had started. In the same instant he remembered that his watch was ten minutes slow. It was already one o'clock!

Since the belt wheel was already in motion, he could not step upon it to climb up the way he had come, nor could

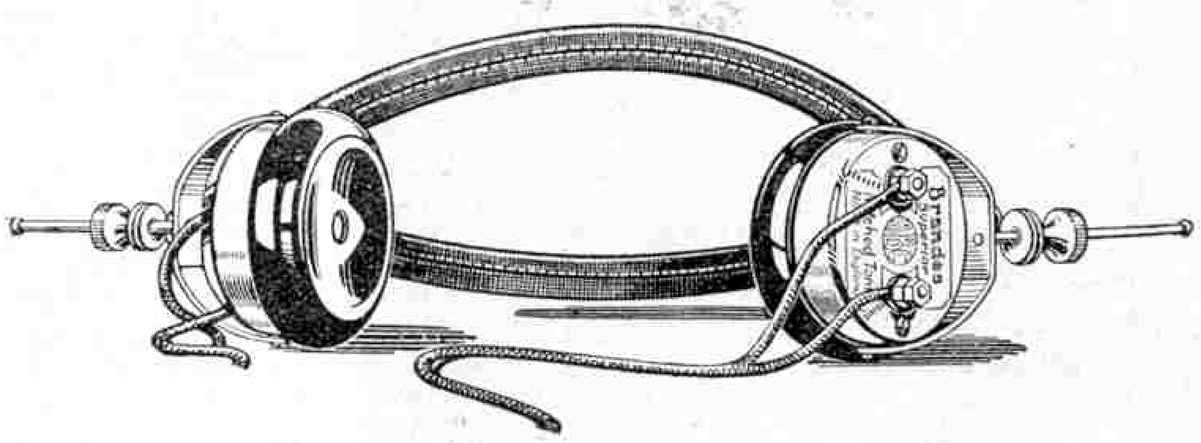
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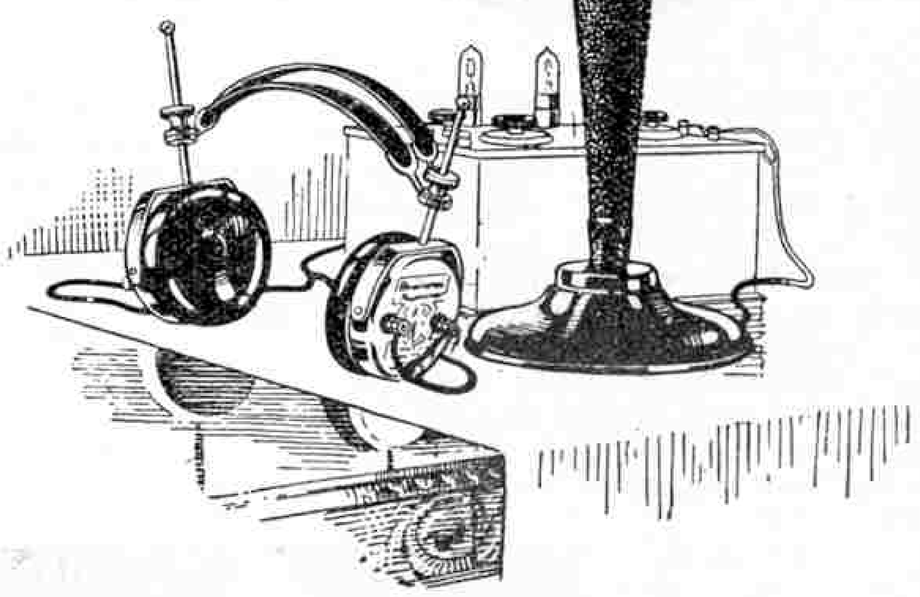
*Reprinted by arrangement with the Editor of *Youth's Companion* (Boston, U.S.A.).

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OH, boy! What fun you'd get with the *Table-Talker*, as well as your *"Matched Tone"* Headphones. Ask Father. Can you think of a better gift for Christmas? Just real fun—fun for the Christmas Vac. —fun all the year round. You will hear every blessed word as plain as though your own form-master were speaking—and it's heaps more interesting. You'd hear real music just as loud as you hear that girl thumping on the piano next door—but no false notes. Oh, no! And it's so pleasantly natural. *Ask your Dealer for Brandes.*



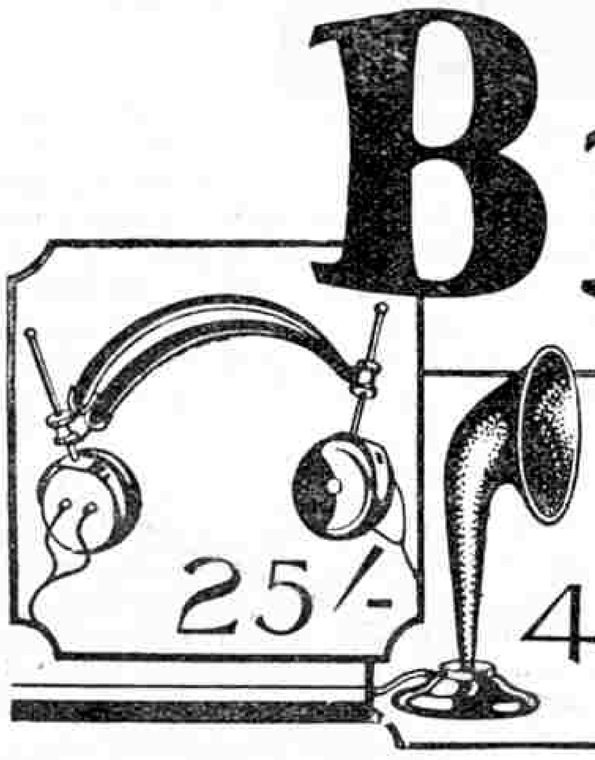


All Brandes products carry our official money-back guarantee, enabling you to return them within 10 days if dissatisfied. This practically constitutes a free trial.

The *"Matched Tone"* feature was embodied as the distinctive characteristic of Brandes' Headphones in 1908, and means that both your ears hear exactly the same sound at the same instant—and you learn a new beauty of tone. They are tested and re-tested for just this one vital point, and in addition their strength, long-wearing comfort and reliable efficiency make them undoubtedly superior. **25/-**

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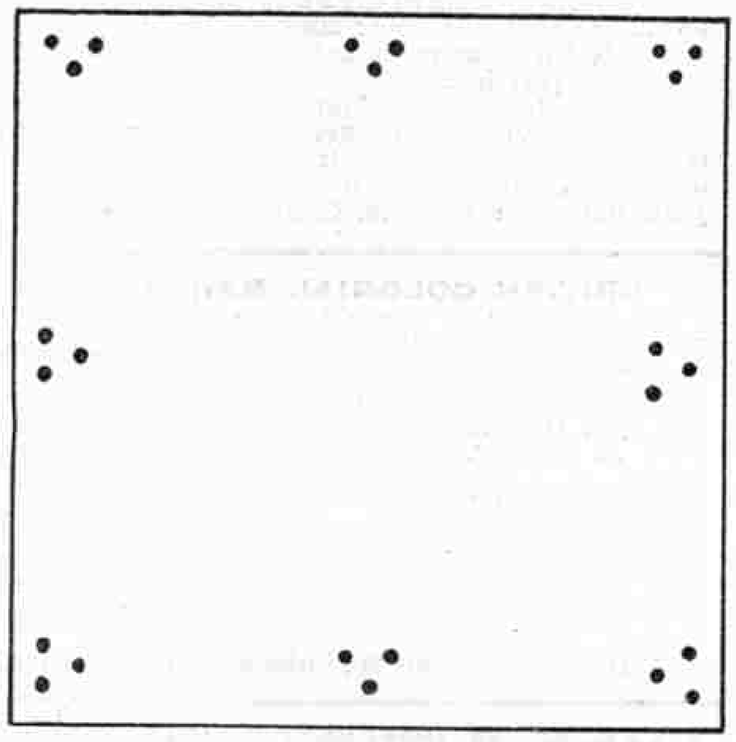


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Result of 16 Years Experience

The name to know in Radio





Puzzle No. 41.

Twenty-four soldiers were billetted in a large square room and the sergeant arranged them to count nine each way, as in the diagram above. Four of these soldiers went out for a walk. How were the remainder placed so as still to count nine each way? The four who went out returned later bringing with them four friends. How were they all placed then to count nine each way? Later on it began to rain heavily and four more soldiers came in to shelter. There were then 32 men in the room. How were they arranged so as still to count nine each way?

* * * *

Puzzle No. 42.

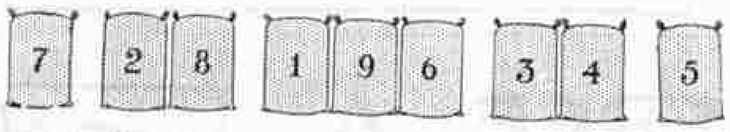
The number 45 is curious. It may be divided in such a manner that if you add two to the first figure, subtract two from the second, multiply the third by two and divide the fourth by two, all the answers are the same. What are the figures?

* * * *

Puzzle No. 43.

Arrange the figures 1 to 9 inclusive into three rows of three in a row in such a manner that each diagonal, each horizontal and each vertical total is 15.

* * * *



Puzzle No. 44.

A miller had some sacks of flour, each of which bore a number as shown in the above diagram. It will be seen that there is a set of three sacks in the middle, next to those on each side is a pair of sacks and on the far side of each pair is a single sack. There is something curious about the figures on these sacks. If the number on the left-hand pair, 28, be multiplied by the number on the adjoining sack, 7, the product is 196, which is the number on the three sacks in the middle. But if the figures on the corresponding right-hand sacks, 34 and 5, be multiplied together, the product is not 196. The problem is to place the nine sacks with as little trouble as possible so that each pair when multiplied by its single neighbour gives the number in the middle.

* * * *

Puzzle No. 45.

What man's name is this :—

Five hundred begins it,
Five hundred ends it,
Five in the middle is seen.
First of all letters,
First of all figures,
Fill in the spaces between.

* * * *

Puzzle No. 46.

I put into a pond six times more Roach than Carp, and Carp a third as many as Tench. Now Tench were less than Bream by two, and Roach twice as many as Tench. In all there were 197 fishes, how many were there of each?

Puzzle No. 47.

A cyclist after a long day's ride found that it was coming on to rain and decided to go home by train. On looking at his map he saw that he had twelve miles to go to the nearest station, and he found that he had 1½ hrs. in which to catch a convenient train. He had four miles uphill which he could walk at four miles per hour; four miles downhill which he could coast at 12 miles per hour; four miles level which he could cover at 8 miles per hour—an average of eight miles per hour. He calculated that he would be just in time for the train. Did he catch it?

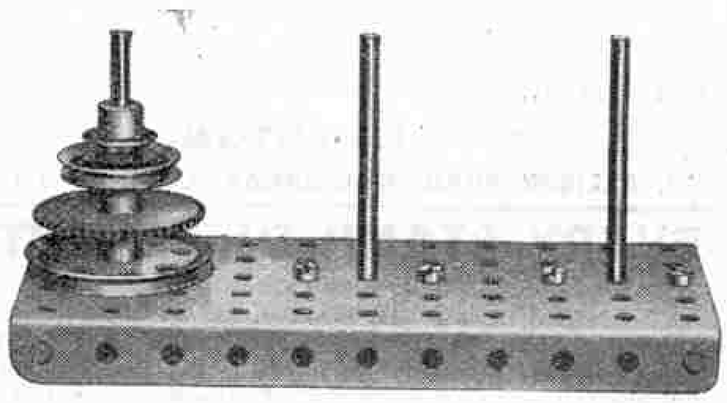
ENTER THIS PUZZLE CONTEST

First Prize : Hornby No. 2 Goods Set.
Second Prize : Hornby No. 2 Tank Loco.
Three Prizes of Meccano No. 1 Radio Receivers or Headphones.

On this page we publish 13 puzzles. Each reader who wishes to enter for this competition must select 10 of these puzzles and send in what he considers to be the correct solutions to them. The first prize will be given to the competitor who solves correctly the whole of the puzzles selected by him, and the remaining prizes will be awarded in order of merit to those sending in the next best sets of solutions. In the event of a tie neatness in writing will be taken into account.

Entries must reach this office not later than 31st December (Overseas 31st March, 1925).

The Five Discs



Puzzle No. 48.

This fascinating little puzzle may be made entirely with Meccano. Its construction is as follows :—Three 3½" Axle Rods are arranged down the centre of a 5½"×2½" Flanged Plate and are gripped by the set-screws of Bush Wheels bolted to the underside of the Plate. On the first Rod five discs are arranged so that each disc is covered by another of smaller diameter. These discs can be conveniently provided by the following parts, placed on the Rod in the order named :—1½" Pulley Wheel, 50-tooth Gear Wheel, 1" Pulley Wheel, ½" Pulley Wheel, and Collar (without set-screw).

The problem is to transfer the discs in the least possible number of moves from the first Rod to the middle Rod, so that their final order shall be the same as that in which they commenced. Only one disc may be moved at a time, and on no occasion may a disc cover another of smaller diameter than itself.

* * * *

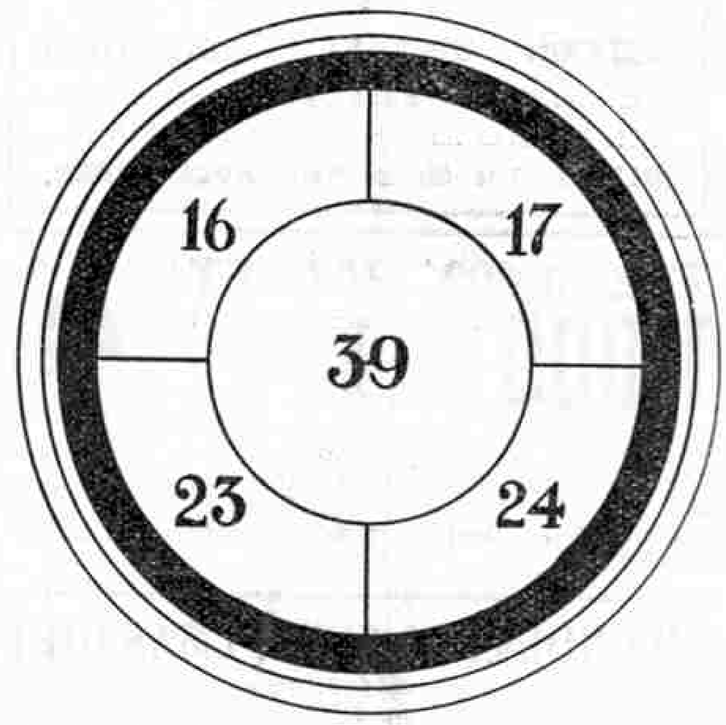
Puzzle No. 49.

When you think you have solved the previous problem in the fewest possible moves, see if you can discover the least possible number of moves it would take to achieve the same result using six discs instead of five, the rules, of course, being the same. For the sixth disc we suggest a 2" Pulley Wheel.

* * * *

Puzzle No. 50.

From the eight letters forming the word "starling" make seven other words, the first containing seven letters, the next six, and so on, the last word having only one letter.



Puzzle No. 51.

Practising with my revolver on the target shown above, I scored exactly 100 points. How many shots did I fire and what parts of the target did each shot hit?

* * * *



Puzzle No. 52.

A bricklayer who was unable to write was obliged to resort to all sorts of devices to make out his bills. On one occasion after carrying out a piece of work he sent in his bill in the form of the sketch shown above. What does it mean?

* * * *

Puzzle No. 53.

Three Kings, whom we will call A, B and C, arrived at the bank of a river with their three servants D, E and F. They had to cross the river, and there was only one boat available and no boatman. The boat was so small that only two could cross at one time. The servants had conspired to murder the Kings if ever they happened to outnumber them, and as the Kings had been warned about this they were anxious that there should never be more servants than Kings together. How did the Kings arrange the crossing so that the servants' plot was frustrated?

PUZZLES WANTED

Do you know any good puzzles? If so send them along to the Editor of the *Meccano Magazine*.

Each month we give a cash prize of 5/– for the best puzzle submitted, and pay 2/6 for any other puzzles used.

We specially welcome original puzzles.

Rough sketches may be sent when necessary. Our artists will re-draw these neatly for making the necessary blocks.

Sit down to-day and send in the best puzzle you know—on a post-card, if you like.

Address your letter to "Puzzles," *Meccano Magazine*, Binns Road, Liverpool.

Stamps for Sale

(*See also pages* 382 *and* 438)

(Advertisement Rates, 10/- *per inch).*

North, South, East and West
HILLIER'S PACKETS
VOTED BEST

ANOTHER VICTORY
for my Bargain Packets, which
TOPPED THE POLL
in the Overseas Section of the "*M.M.*"
Bargain Spotting Competition
Was also **VOTED BEST** in the Home Section.
Write for list of this month's wonderful bargains.
HILLIER, The Stamp Mart, HORSMONDEN.

THE "1,000" PACKET

1,000 500 well-mixed Foreign Stamps containing many usually sold at ½d. and 1d. each. 100 UNUSED (a complete sheet), 25 well-mixed BRITISH COLONIALS, a 12-page booklet for holding duplicates and 375 Patent "Strip" Stamp Mounts.

4½ D.

Postage 2½d. extra. Abroad 6d. extra.

WATKINS (M. Dept)., Granville Road, BARNET.

A WONDERFUL CHRISTMAS GIFT

To all bona-fide applicants for our bargain approvals, we offer

FREE 3 Unused Ceylon, 50 Unused Foreign (in 25 pairs), 1 Batum "Brit. Occ." (cat. 1/6) **FREE**

Please mention "*M.M.*," enclose 1½d. postage, and state whether a beginner or medium collector. You'll never regret getting into touch with

THE EASTERN COUNTIES STAMP CO., Withersfield, S.O., Suffolk.

BARGAIN PACKET for 1/-

including 2 Nicaragua, cat. 10/-; Salvador, cat. 6d.; Transvaal 2/6 unused; Norway, cat. 1/-; Abyssinia, cat. 1/-, postage extra. Over 200 sets of stamps free. Write for particulars.

C. LEWIS, 26, Lichfield Rd., Cricklewood, London.

---

25 AUSTRIAN FIELDPOST 7d.

A nice all-different selection of these finely-printed, historical and hard-to-get stamps, including over-printed for occupied countries. A very attractive lot, **7d. post free.** Best stamp mounts, **4½d. 1,000; 5,000 1/8**, post 1½d. if ordered alone. All catalogues supplied. Album list free.

W. E. WILLIAMSON, 55, Nunhead Grove, London, S.E.15.

---

50 High Values, etc. - - 1/-.

My Christmas Advertisement Packet contains exceptional value.

50 Colonials and Foreign, clean and off paper, including U.S. Africa, ½d.–1/-; Greece, 1 and 2 drachma; Australia, 6d. and 1/-; Southern Rhodesia, Gibraltar, etc., etc. Postage extra.

GAZE, DIDSBURY, MANCHESTER.

BEGINNER'S STAMP ALBUM

to hold 1,250 Stamps and 200 Stamps post free 1/4 P.O.
We also buy Old Stamps.

T. Clement, Philatelic Market, Bell St., Wolverhampton.

Free! 25 Different Portuguese Colonials Free!

The above is a SUPERB LITTLE COLLECTION that I have specially made up as a FREE GIFT to Readers of the "MECCANO MAGAZINE" who ask to see my FAMOUS "OAK" APPROVALS. A POSTCARD will do, but Collectors who enclose postage will receive in addition a scarce EGYPTIAN WAR ENVELOPE. Mention Gift M.M.2 and write early for approvals to:

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GRAND CHRISTMAS OFFERS

100 British Colonials, cat. over £2	8/6
50 British Colonials, cat. over 12/- ... ... (No Transvaal).	2/6

Only Mint and fine used copies included.

Leeward Islands 3d. K.G., cat. 2/6, mint ...	10d.
Sudan 4 Mils S.G. 21, cat. 1/-, mint	4d.
Belgium 1915 1c. to 2 fr. (set 13), fine used ...	1/-
50 Fine Pictorials, all different and mint ...	2/3
14 Turkey Pictorials, all different and mint ...	1/6
250 B.C. and Foreign, all different, fine ...	9d.
500 B.C. and Foreign, all different, fine	1/9

Belgium (15)	Japan (5)	Roumania (10)	2/6
French Col. (10)	Epirus (8)	Switzerland (15)	
Nyassa (10)	Latvia (2)	S. America (10)	
Bulgaria (6)	Turkey (5)	Mozambique (4)	

A Fine Collection.

Every one of the above lots a bargain. Send early to secure them, as in some cases stock is not unlimited. Postage extra on orders under 2/6.
For further selections write or call
W. H. TAYLOR,
Dept. A., 26, Meadows Road, Sale, Ches.

A PAIR OF TURKEYS (Obsolete).

FREE and any one of the following sets to genuine applicants for approvals.

6 Mint Hayti, 1904.	15 Ruthenia & Ukraine.
14 German Provs.	14 Soviet Russia & Danzig.

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Cheap Sets: 150 German, 1/-; 50 Roumania, 1/-; 25 Dutch, 6d.; 20 Venezuela, 9d.; 40 French Colonies, 10d.; Transvaal Edward, 5/-, 10/-, 20/-, 4/3 set; 500 Diff. Stamps, 2/9; 250 Diff., 1/-; 25 Bulgaria and Thrace, 8d.; 8 Cochin, 6d.

Ask for particulars of how to increase your collection Free.

ALBAN SIMMONS, Hillside, NEW BARNET.

SPECIAL XMAS OFFER.

A packet of 500 Foreign Stamps containing a good assortment. Set of 3 Irish Free State (overprinted). Fine Set of 7 unused Polish.

The whole of the above 510 stamps sent post free on receipt of 6d. to cover cost of postage and packing.

A. F. LANGTON,
37, ALLISON ROAD, HARRINGAY, LONDON, N.8.

EVERY STAMP DIFFERENT

Condition Fine.

20 Iceland, 1/-; 40 Finland, 9d.; 50 Czecho-Slovakia, 8d.; 50 Georgia and Ukraine, 1/3; 50 Russia, 9d.; 50 Roumania, 9d.; 50 Latvia and Esthonia, 2/-; 50 Austria (only Feldpost issues), 1/9; 40 Airpost, 1/6; 50 Central Lithuania, 1/6; 100 mint Germany Republic, 9d.; 25 Bosnia, 8d.; 300 Austria, 1/6; 50 Dantzig, 1/-; 50 Turkey, 1/6. **Postage Extra.**

C. FAULKNER, 90, Woodland Rd., LONDON, S.E.19.

SOME REAL BARGAINS (till 10th Jan., 1925.)

Send 1½d. stamp for my general list. The following post free; no duplicates in any of the packets. 225 German Empire only, 2/6; 400 Austria Hungary, 4/6; 60 Roumania, 1/-; 90 Poland, 1/9; 82 France, 1/-; 50 China, Japan and Siam, 10d.; 50 Holland and Colonies, 9d.; 40 Czecho-Slovakia, 8d.; 108 French Colonies, 1/9; 25 New Zealand, 6d.; 22 Austral. Commonwealth, 10d.; 50 Argentine, 11d.; 35 Brazil, 1/6; 20 Victoria, 6d.

ERNEST HARROD, 110, Pepys Road, London, S.E.14.

FREE PACKET of used and unused stamps, including 12 unused POLAND, set of 4 used UNION OF SOUTH AFRICA, MOZAMBIQUE, PERSIA, etc., to applicants for our famous approval sheets and sets.

Montpelier Stamp Co., 79, Cobourg Road, Bristol.

Special Offers to Young Collectors

and those with only a modest collection.

(1) Packet containing 60 British Colonials, all different, no stamp catalogued under sixpence, fine opportunity to secure rare stamps at bargain rates. Cash with order, 5/- post free.

(2) Pack containing 200 Foreign, all different, many rare stamps in these packets, quite different from general run, being taken from genuine collections in very old albums. Cash with order, 3/6.

John Burgess, N.R.P., 48, Green Street, Eastbourne.

BRITISH COLONIAL BARGAINS.

100 all different, 1/-; 200, 3/3; 300, 6/-; 400, 9/9; 50 different Queen's Heads, 1/6; 25 King Edward, 1/-; 50 King Edward, 3/6; 50 King George, 1/6; 50 Picturesque and Zoological, 1/3. SETS: 15 Palestine, 2/6; 20 Barbados, 2/6; 45 Indian Native States, 1/6; 25 South Africa, 1/-; 25 Australia, 1/-; 12 Cochin, 1/-; 18 Ceylon, 1/-; 4 Bermuda, 6d.; 20 Canada, 6d.; 11 Irish, 9d.; 20 Egypt, 6d.; 25 India, 6d.; 10 Newfoundland, 6d.; 6 British Guiana, 3d.; 40 Great Britain, 6d.; 4 Cyprus, 3d.; 6 Jamaica, 3d.; Add Postage. Price List Free. Peerless Mounts, 1,000 in Box, with Free Watermark Detector on bottom. Post Free 9d.

R. A. KING, 9, Seymour St., Lisburn, Northern Ireland.

FREE 25 DIFFERENT UNUSED PORTUGUESE COLONIALS including fine set **AZORES** with new issue pictorials. Set 4 **Guinea**, 4 **Mozambique**, 4 **Cape Verde**, 4 **St. Thomas & Prince**, set **Angola**, etc., catalogued over 2/- (usual price 6d.) In order to circulate our Latest List and old 1914 Approval Sheets which we are clearing at half price, we will send this packet **FREE** to all sending **1½d.** stamp for postage (abroad 2½d.)

SPECIAL OFFER.—Complete mint set of 39 different scarce **1923 German Provisionals** from 5,000 M. on 40 M. to 1,000,000,000 M. on 100 M. (usual price 2/-) offered for **6d.** post free.

Collections and Loose Stamps Bought. Highest Prices Paid
HORACE MILLER & CO., WHITSTABLE.

NO NEW EUROPE

FREE. 25 BRITISH COLONIALS and 10 S. American, including W. Africa, Newfoundland, Travancore, Jamaica, Queensland. To applicants for my famous approvals, enclosing 1½d. postage. 250 Unused Stamps, 1/3.

FLEMING,
St. Winifreds, Christleton Road, CHESTER.

FREE

and post paid to all genuine collectors asking to see our approval books.

This packet contains high value **Greek pictorial catalogued 3/-**, Gwalior official, Hungarian revolution (eagle), set of 3 China ships, **Bolivia** arms, Bulgaria pictorial, Norway, **Wallis and Fortuna Island, set 5** Switzerland, Sweden, Denmark, **Venezuela high value catalogued 1/-**, Germany 50 million Marks, Pair large Ukraine pictorials, Ireland, and **an obsolete 3-cornered stamp in fine condition.**

ASK FOR 3 CORNER PACKET

Send a postcard to-day. *Only* 1 *lot allowed each applicant.*

R. Wilkinson, Provincial Bldgs., Colwyn Bay

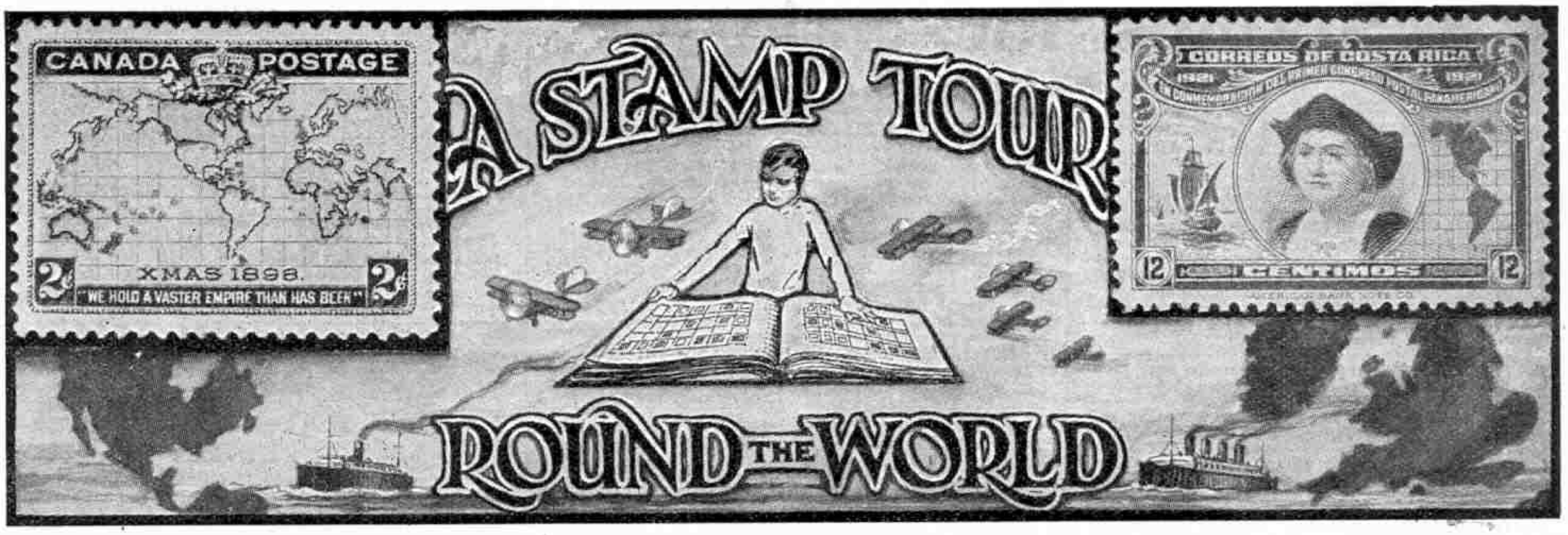
TRIANGULAR STAMPS
BRITISH COLONIAL AND WAR.

Stamp Collector's Outfit and 60 Different Stamps FREE!!

INDIAN NATIVE STATES, 25 UNUSED, ETC.

This tremendous advertising offer contains all the following:—Czecho-Slovakia, Gwalior on India, Fiume (newspaper), Cape Verde (postage due), Prussia, Peru (San Martin), Laibach (Jugo Slavia), Schleswig Holstein, Saint Thomas, Republic of Ukraine, etc. Pkt. of finest stamp mounts and the new unique accessory, a combination pocket folder and mathematically-correct perforation measure. The whole valuable parcel absolutely free on receipt of postcard requesting approvals.

LISBURN & TOWNSEND, 201a, London Road, LIVERPOOL. **COLLECTIONS PURCHASED.**



IV. BRITISH GUIANA, JAMAICA AND PANAMA

MARTINIQUE, a French colony about 50 miles from Guadeloupe, consists of groups of volcanic mountains in the north and south, with lesser heights between. Fort de France (1908 issue, 25c. to 75c.) is the capital of the island and possesses a fine harbour guarded by forts. It is situated on Fort de France Bay, on the west coast of the island. Earthquakes are frequent, and the island for long will be remembered as the scene of the terrible eruption of Mont Pelé, one of the northern mountains, in 1902, when several towns were destroyed and 40,000 inhabitants killed.

Rivers that Dry Up

St. Lucia is 24 miles south of Martinique, and is considered to be one of the most beautiful islands of the West Indies. The chief natural feature of the island is The Pitons (1902 commemorative issue 2d.), two immense pyramids of rock rising abruptly from the sea, their slopes, inclined at an angle of 60°, being clad on three sides with dense verdure. They are 2720 ft. and 2680 ft. in height respectively.

From St. Lucia we pass by way of Barbados and Tobago to Georgetown, the capital of British Guiana—the only British possession in the South American continent. Those who have only seen it on a map often think that British Guiana is quite a small country, but, as a matter of fact, it is twice the size of Great Britain. There are 78,500 square miles of dense jungle, and this makes travelling overland impossible. The only way to get from one place to another is by the rivers, which are to be found everywhere, but even then it is not an easy matter, for many of them have the annoying habit of unexpectedly drying up!



We are exceedingly fortunate on this tour in having our fleet of aeroplanes, which take us inland to the places depicted on the beautiful pictorial stamps issued in 1898 to commemorate Queen Victoria's Jubilee. The engraving of the stamps of this set is particularly good and the colours are very tastefully chosen, with the result that the set is one of the finest issued. There are two types, the view on the 1c., 5c., and 15c. values showing Mount Roraima, and that used for the 2c. (illustrated on this page) and 10c. showing the famous Kaieteur Fall.

Mount Roraima and The Kaieteur Fall

Mount Roraima is 8,635 ft. in height and is on the boundary of the country. It is the highest mountain in the Pacaraima range, which runs across the country from west to east, and is of remarkable shape. It rises like a vertical wall of red rock to a height of 1,500 ft., and was considered to be unclimbable until two men, named Thurn and Perkins, succeeded in finding a way up in December 1884. The summit is a large tableland with an area of about 12 square miles. At the foot of the mountain are the forest-clad slopes so typical of the country.

The Kaieteur Fall is only one of many magnificent waterfalls to be found in this district. Here the river Potaro, a large tributary of the Essequibo, descends a cliff by taking one huge leap of 822 ft. The Fall was discovered in 1870 by C. Barrington Brown, who was occupied at the time upon a geological survey. The water falls in a vertical column for 741 ft., and from the foot of the fall it becomes a roaring cataract to the valley beneath. The breadth of the stream composing the fall itself varies from 400 ft. in the rainy season to only a quarter of that breadth in dry weather. The Kaieteur is normally five days' river-journey from Georgetown, although the distance between the two places measured in a straight line is only 130 miles.



The Rarest Stamp in the World

British Guiana is well-known to stamp collectors for its type-set stamps, many of which were set up and printed at the office of the "*Royal Gazette*" in Georgetown. These stamps were printed in black on coloured wove paper and each one was initialled by the postmaster or post-office clerks before being issued!

Among these type-set stamps is to be found the rarest stamp in the world, the 1c. black on paper surface-coloured magenta. This stamp, in common with a 4c. of similar design, was set up and printed at the office of the "*Official Gazette*" by Messrs. Baum and Dallas, Georgetown, and issued in February 1856. Only one copy of the 1c. black is known to exist and this was sold by auction in Paris in 1922 for £7,000.

We Call at Jamaica

If we look at a small map, a voyage from British Guiana to Jamaica appears to be almost a return on the course we have lately traversed, but in reality the two paths are over three hundred miles apart.



The Llandovery Falls, the first view of Jamaica to appear on a stamp, have been described and illustrated in the "*M.M.*" already (April 1924, p. 99). They are situated in the district of St. Ann on the northern portion of the island and form the view on one of the favourite local picture postcards. The remaining views of Jamaica form part of the pictorial set issued in 1921. In this set the 2d. shows the King's House at Spanish Town (1762–1872), the 4d. (illustrated on this page) shows the Spanish Town Cathedral, the 1/– a statue of Queen Victoria—"of Jamaica, Lady Supreme"—the 2/– the memorial to Rodney, who with Hood saved Jamaica from invasion by the French and Spanish in 1782, and the 3/– a statue of Sir Charles Metcalfe, Governor of the island from 1839 to 1862.



An Engineering Wonder: The Panama Canal

From Jamaica we continue westwards until we arrive at Colon and the beginning of the Panama Canal, one of the most striking engineering achievements of modern times. The canal is about 50 miles in length, and its construction was only made possible by first eliminating tropical diseases from the whole area so that the great army of workmen could live there

(*Continued on page* 383)

Stamps for Sale

(*See also pages* 380 *and* 438)

100 1d. RED PLATES 1/–, mixed. Beginner's packet 1/–.—Richards, 68, St. James' Road, Croydon.

200 STAMPS FREE. Ask for approvals.—Dickinson (Dept. M.), 733, High Road, Leyton.

200 MIXED UNUSED STAMPS 7d.—G. P. Cranwell, 55, Cowslip Road, London, E.18.

FOR APPROVALS you should write to John Downes, 223, Camden Street, Brookfields, Birmingham.

FREE. Six rare Persian 1 to 13 ch: complete.—Aldis, 74, Marine Parade, Yarmouth.

1/- for 6d. First 10 approval applicants may pick **half-price ! !**—Place, Woodhurst, Huntingdon.

STAMP ALBUM GRATIS. Approvals. Postage 3d. Abroad 1/–.—Neave, 25, Portnall Rd., Paddington, W.9.

LATEST. 250 Stamps. Pictorial, Asiatic, good Colonial, War Stamps, Obsolete Sets, etc., complete for 3d.—White, 6, Stourbridge Road, Lye, Stourbridge.

112 Different Stamps including Jamaica, Nicaragua, Tasmania, Travancore, Peru, 6d.—Kraus, 137, Cheapside, London.

SPACE FILLERS, ½d. to 3d. About 500 sent on approval. A useful selection.—D. Pratt, 10, Lion Gate Gardens, Richmond, Surrey.

FREE. Sheet 50 unused stamps to genuine applicants for approvals, good value, farthing upwards. Cheap sets. Send postage.—Croft, Adel, Leeds.

GRENADA 6d. tête-bêche, scarce used pair, 1/3 (select 1/8).—New Century Stamp Agency, Cornwall Rd., Bristol (Est. 1901). Postage extra. List free.

FREE. 40 different Foreign and Colonial Stamps, used and unused, including latest issues. Postage 1½d.—Howell, 20, Trilby Road, Forest Hill, London.

TURN YOUR STAMPS INTO CASH ! I buy stamp collections for cash. Let me know what you have to sell and price. Box 1202.

GOOD PRICES OFFERED for used stamps of any country of 3d., 6d., 1/– values and over, either of current or earlier issues. Box 1204.

SPECIAL CLEARANCE of old approval sheets. 7 Cochin free to applicants for a selection.—S. Huckle, 53, Birkenhead Avenue, Kingston-on-Thames.

GENUINE BARGAINS. Selling off. 100 Foreign Colonial Stamps all different, 1/2 Postal Order. 250 2/2. Worth 10/–.—Scott, 154, Wellesley Road, Ilford.

100 VARIETIES, 1/2, Foreign and Colonial, 66 to 80 per cent. under catalogue; 1d. blacks; approval.—Rev. Bell, Loughguile, Co. Antrim.

FREE. 50 STAMPS to genuine applicants for approvals.—Charlesworth & Hall, 34, Alexandra Road, Ansdell, Lytham.

SPECIAL XMAS OFFER. 50 British Colonials, Mint and used, including **high values,** 1/3.—E.C. Fisher, 13, Cumberland Road, South Norwood, S.E.25.

60 Different Stamps Free to applicants for approvals. All ½d. each. Cheaper line, 200 different 6d.—Cox, 135, Cambridge Road, Seven Kings.

385 STAMPS guaranteed all different. Clean and Perfect, 2/–. Wonderful value. Suitable Xmas Gift.—J. Baron, 8, King Edward's Gardens, Barnsley.

STAMPS. Every Meccano boy should send for our approvals and latest scheme for young collectors.—Fairweather, 64, Barker Street, Lozells, Birmingham.

FREE. 24 High-class British Colonials, 24 Foreign 1½d. Postage. Dispersing Collection. Approvals from ½d. Good British Colonials from ¼ Cat.—Hill, Romolo, Lindfield, Sussex.

STAMPS. Dispersing Collection 22,000 (also Collection entire £1 and £25). Approvals 8d. and 9d. in 1/– discount, cash or exchange Meccano or anything useful.—"Olivet," Stretton Road, Addiscombe.

FREE to approval applicants, 20 King George Colonials, including Caymans, Fiji, Leewards. Enclose postage.—Ryder, 38, Clifford St., Brook's Bar, Manchester.

"THE PHILATELIC MAGAZINE," 46, Victoria St., London, S.W.1. Best stamp newspaper. Order from your newsagent. 3d. fortnightly, or send 4d. for specimen and bonus form worth 2/6. Album catalogue free.

Try My 2/– Bargain Parcel. 25 Roumania, 35 France, 50 Hungary, 12 Ceylon, 10 Irish, 7 mint Angola, above all different, 100 mint Germany, 100 Europe, used, 50 British Colonials.—A. Brown, "Maybank," Wembley Hill.

FREE 2 UNUSED WEMBLEY to all purchasers over 1/6. 100 diff. Stamps, 4d.; 300, 1/2; 40 French Cols., 6d. "Everyland" Album, 1/9; "Victory," 2/9; 1000 Mounts, 6d.; All post free.—R. Edmondson, Queen Street, Morecambe.

STATE COUNTRIES YOU COLLECT. Approvals sent. Thousands of varieties. Packets 1/–, 2/6, 5/–, Mixed or Colonial. All good copies. First-rate stamp, value 2/6, to purchasers of 5/– packet. List of valuable stamps on application.—Rev. Beach, 18, St. Martin's Rectory, York.

XMAS PARCEL. 1,000 Fine Stamps, including British, French, Portuguese Colonials. Pretty Pictorials. Over 300 varieties. Fine condition, delightful present. P.O. 2/6.—J. G. Price, 9, Blythe St., Everton, Liverpool.

SET 14 1921 UKRAINE PICTORIALS 1½d. P. Free. Approvals for Beginners from ¼d. Sets from 2d.—R. A. Clipston, 11, Cromwell Avenue, Bromley, Kent.

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Discoveries in Meccanoland—

(*Continued from page 375*)

will climb or tumble down the pole as required in a most realistic manner.]

Just then I noticed a queer little figure propelling himself vigorously along in a bath-chair. "That is our oldest inhabitant," said the King in reply to my question. "A wonderful old man—he has a face as bold as brass, a constitution as strong as steel, yet he cannot walk for nuts!"

[OLDEST INHABITANT. The chair does not present much difficulty, its principal parts being two Sector Plates and four 5½" Strips, and it runs on three 1" Pulley Wheels—one in front and two at the back. One of these (not visible in the photograph) drives by cord another 1" Pulley Wheel, the shaft of which also carries a Bush Wheel. As will be seen, a 2½" Strip is pivoted at one end to this Bush Wheel and at the other to a second 2½" Strip which, rocking about an axle journalled through its centre hole, is again pivoted to the old man's hand. As for the occupant, he has dispensed with his legs altogether, for he doesn't require them with such a luxurious bath-chair! His neck is a Flat Bracket; his right (or propelling) arm consists of one Angle Bracket, one ½" Reversed Angle and two Flat Brackets, and his left arm—the hand of which is loosely bolted to the chair—formed by three Angle Brackets. This is a most amusing little model and has a wonderfully realistic appearance. When wheeled along the table the little fellow appears to energetically push himself along.]

Passing through several long streets of fine buildings, we presently came to some splendid recreation grounds. Here we stood gazing at a wonderful gymnast, who seemed to be attempting to dislocate his arms with horrible regularity! Next, my attention was attracted by an extraordinary step-dancer, who defied the laws of gravity, and two fencers who fought valiantly with a great amount of skill.

[THE GYMNAST is easily constructed by following the accompanying illustration. His companion demonstrates another method of working by means of a cord, which should be wound twice round the 1" Pulley Wheel.]

[THE STEP-DANCER. In this model a 5½" Strip bolted to the back of the figure is pivoted to one of the flanges of the base Plate. A 2½" Strip is then pivotally connected at one end to this 5½" Strip and at the other to the Bush Wheel carried by the Crank Handle. Each of the dancer's legs consists of one Angle Bracket, one ½" Reversed Angle Bracket, and one Flat Bracket. His arms are formed of one Flat Bracket and two Angle Brackets. He should be pivoted at his "knees" and "elbows," and on a slight movement to and fro—not rotary—of the Crank Handle—he will go through some very weird antics.]

[THE FENCERS. Cords are attached to the foot of each fencer and passed through suitable holes in the Flanged Plate so that when pulled they will cause him (the fencer) to turn on his pivot. Great fun can be had with this model if two people are playing with it, since each can take a cord and attempt to out-fence the other. The figures should be *pivotally* connected to the legs on which they stand to enable them to lift their free legs clear of the plate.]

Leaving the crowd, we gained the main road and found it thronged with traffic of all kinds. I jumped back as a motor-cyclist with pillion-rider dashed by at a terrific speed. I was reassured, however, when the King told me there were no such things as accidents in Meccanoland, for the simple reason that the Meccanitians were far too tough to be hurt, however much you knocked them about!

"In that building," said the King, directing my attention to an imposing structure, "you will find billiards and bagatelle in full swing, and indeed almost every other form of indoor recreation."

"You will soon learn that the inhabitants of Meccanoland are never idle. The few hours that they are able to snatch from their busy day are not idled away—on the other hand, they are packed full of real fun and enjoyment. Every day more and more boys in your world are learning this secret of busy happiness."

(*To be continued*)

A Stamp Tour Round the World—

(*Continued from page 381*)

until the work was completed. The canal made it necessary to construct a lake of immense size, and to remove one side of a mountain. The work was commenced by the French, abandoned, and finally completed by the United States, the Canal being opened on 15th August, 1914, just over ten years ago.

When passing from one ocean to the other, vessels are lifted to a height of 85 ft. above sea-level and at the other end of the canal they are lowered again to sea level. This is accomplished by means of locks, which we hope soon to describe in greater detail in a special article on this great engineering achievement.

When a map is consulted a most unexpected fact reveals itself, for it is then noticed that in passing from the Atlantic to the Pacific (that is, from the eastern ocean to the western) a vessel actually travels in the opposite direction, with the result that it finishes more eastward than it began! This is, of course, owing to the geographical direction of the isthmus at this point.

The Stamps of Panama

In 1915 the Republic of Panama issued a series of commemorative stamps showing views of the canal. The 1c. value, which is reproduced here, shows a map of the Canal Zone. In this map a line drawn from north to south begins approximately at the "R" of "REPUBLIC" and ends at the "M" of "CENTESIMO," from which it will be seen that the Atlantic is on the left and the Pacific on the right when the stamp is the normal way up.

Commencing at the Atlantic seaboard, the canal is carried through Limon Bay near Colon, the coast-line of this bay being five miles from deep water where the canal really begins and from which the measurements are taken. At the seventh mile the canal enters the Gatun Lake by the three Gatun Locks. From here to the Culebra Cut is 29 miles, and four miles beyond the cut is the Pedro Miguel Lock. After passing through this lock, Lake Miraflores is entered, at the far end of which are the Miraflores Locks that bring the vessels back to sea-level. From the Miraflores locks to deep water is another eight miles, the total distance between deep water in the Atlantic and deep water in the Pacific being 50 miles.

The 5c. (also illustrated) shows the Gatun Locks, which are nearly three-quarters of a mile in length. The 10c. shows the Culebra Cut.

In 1918 a further series of pictorial stamps of high values was issued showing ships on various parts of the canal, such as at the Gatun Locks and the Culebra Cut.

Until 1903 Panama was a department of the Republic of Colombia, but in November of that year the Canal Zone, a strip of land extending for five miles on either side of the canal, was ceded to the United States. The canal is of great service to shipping, and during 1923 over 19½ million tons of cargo in 3,967 commercial vessels passed through it.

NEXT MONTH:—
CENTRAL AMERICA



Electricity

X. ELECTRIC BELLS

OF all electrical instruments the electric bell is by far the most familiar. To-day nearly every house is fitted with a bell of this kind which, for ordinary domestic purposes, surpasses all other types of bell for convenience, reliability and simplicity of mechanism. Considering the valuable work electric bells perform their simplicity is really remarkable, and this is a point that Meccano boys would do well to bear in mind when they are building models of their own invention. Provided the piece of mechanism accomplishes efficiently the work for which it is intended, its value may be greatly increased by reducing to a minimum the number and complexity of its moving parts.

The Single-Stroke Bell

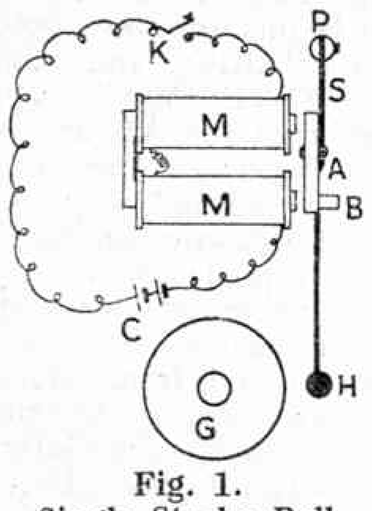


Fig. 1.
Single Stroke Bell

The type of electric bell used in our houses, shops, hotels and other buildings is that known as the "trembler bell." Before describing the work of this type of bell, however, we will consider for a moment an even simpler type known as the "single-stroke" bell. This bell consists of a horse-shoe electro-magnet, M, Fig. 1, and a pivoted soft iron armature A, to the free end of which is attached the hammer H, which strikes the gong G when the armature is pulled towards the magnet. The pivoting motion is obtained by means of a spring S, which attaches the armature to an upright brass post P. This spring is so attached that it pulls the armature away from the magnet towards the stop-block B. When the push, K, is pressed down, an electric current from the battery C passes round the magnet, the armature is attracted and the hammer strikes the gong and thus produces a single ring. The magnet remains magnetised as long as the current flows round it, and thus the armature is kept attracted until the current ceases. Therefore, in order to sound the bell a second time, the push must be first released and then pressed again.

The number of rings given by a single-stroke bell is absolutely under the control of the operator, for this is always the same as the number of times the push or switch is pressed down. For this reason this type of bell is of considerable value for signalling purposes, and it is used on all British railways for communicating from one signal-box to another.

If we can attach some kind of automatic switch to a single-stroke bell so that the current is switched off as soon as the armature is attracted towards the magnet, the armature will immediately spring back to the stop-block. When this occurs, if the current can be instantly switched on again the armature will again be attracted, and so long as the automatic arrangement continues to start and stop the current, this cycle of operations will be repeated over and over again during the whole time that the bell push is kept pressed down.

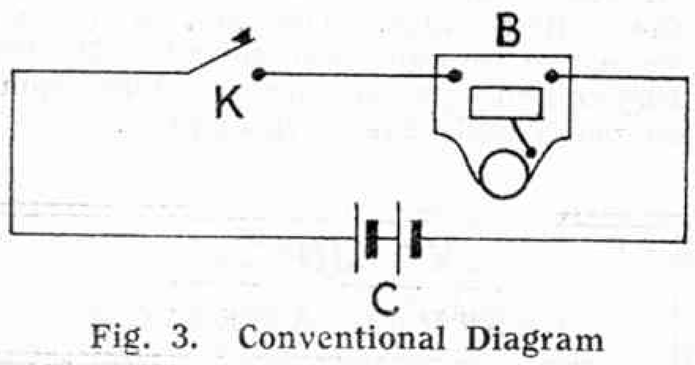


Fig. 3. Conventional Diagram

The Trembler Bell

This is exactly what takes place in the case of the ordinary household trembler bell. The construction is to a large extent the same as that of the single-stroke bell. There is the magnet, M, Fig. 2, the armature A held by the spring S fixed to the post P, and at the end of the armature is the hammer H which strikes the gong G when the armature is attracted to the magnet. Fixed to the base-board of the bell is a brass block B, through which passes a bolt called the contact screw CS. This screw is adjusted so that its point just touches the armature when this is not attracted by the magnet. When the switch is depressed current flows from the battery through the switch and round the magnet to the post P. From there it passes by way of spring and armature to the contact screw CS and the block B, from which a wire conducts it back again to the battery.

When the current flows and the armature is attracted towards the magnet it leaves the contact screw and thus immediately cuts off the current. The magnet now loses its magnetism and allows the armature to spring back and touch the contact screw again, thus switching on the current, so that the whole operation is immediately repeated. This procedure continues automatically as long as the switch is depressed, and the result is to produce a rapid succession of strokes on the gong. Considerable "sparking" takes place at the contact points of the armature and the contact screw, and therefore these points are coated with platinum or other non-oxidising metal so that the electrical contact will remain good.

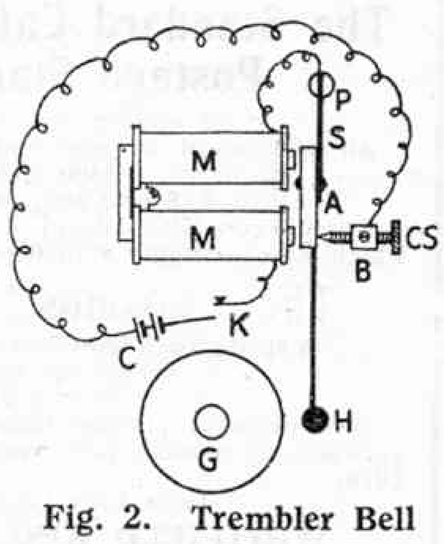


Fig. 2. Trembler Bell

Conventional Signs

It will have been noticed that in these two diagrams two conventional signs have been introduced namely, the switch or key K and the battery C. In diagrams of electrical wiring much time would be wasted if every item had to be drawn in full, and therefore a number of signs have been agreed upon to represent various parts of electrical apparatus. These signs are usually a sort of simplified drawing of the instrument or part they represent. Fig. 3 shows the same circuit as in Fig. 2, but by means of the conventional signs. The bell B is easy to recognise, K is the key, switch or push, and C is the battery. Whenever a bell appears in a diagram it is presumed to be of the trembler type unless otherwise stated. In the conventional representation of batteries a series of alternate long thin lines and short thick ones is used as in Fig. 4. One long and one short line represent a single cell of two volts, the long line standing for the positive pole and the short one for the negative pole.

Relays Used in Large Buildings

When the push or switch of an electric bell is a long way from the bell itself, as often happens in large buildings or works where a push in the basement may be required to ring a bell in the top storey, an instrument known as a "relay" is used.

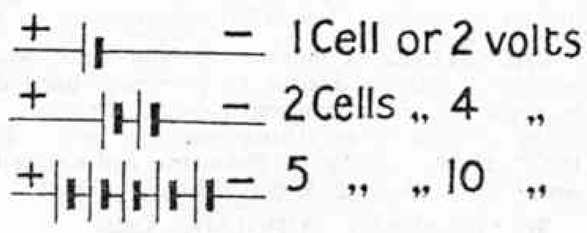


Fig. 4.
Conventional Sign for a Battery

The principle of the relay is shown in Fig. 5, from which it will be seen that the apparatus consists simply of an electro-magnet M which attracts an armature A fixed so that the contact screw CS touches CP when the armature is attracted to the magnet. It will be seen that there are two independent circuits, one containing the push K, the electro-magnet M and the battery B, and the other containing the bell, a second battery BB and the contacts CS and CP. The first circuit passes through the building to a point near the bell. When the push is depressed current flows from battery B and round the magnet, so that the armature is drawn towards the magnet and CS and CP touch. This brings the second circuit into action, so that current from battery BB rings the bell.

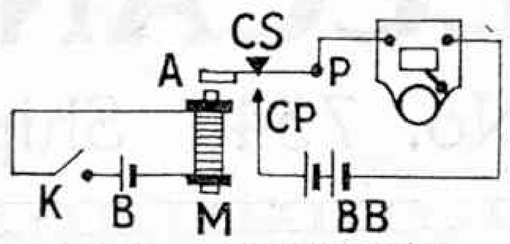


Fig. 5. Relay Working

The advantage of relay working is that smaller batteries may be used than would be possible with a simple circuit, which owing to the resistance of a great length of wire would require a comparatively large battery. In the example just considered the battery BB need only be just strong enough to work the bell, while the relay battery B also may be quite small as the relay is adjusted to work with an exceedingly small current. The result is a saving in current that more than compensates for the added cost of the relay.

Indicators for Bell Systems

Many houses have bell-pushes in practically all the rooms. These all ring one bell in the kitchen, and in order to show from which room the ring has come an indicator is fitted. Before explaining the working of a bell indicator we must first see how a number of bell-pushes can be arranged so that any one of them can ring the bell. Fig. 6 shows a bell and battery that can be controlled by any of the pushes placed in various rooms throughout the house. It is obvious that, no matter where these pushes may be placed, pressure on any one of them will complete the circuit through the bell and the battery, and consequently the bell will ring. In wiring a house for this system it is usual to take two main wires from the bell and battery to the furthest bell-push and to join branch wires to these to lead into each room where a push is to be placed.

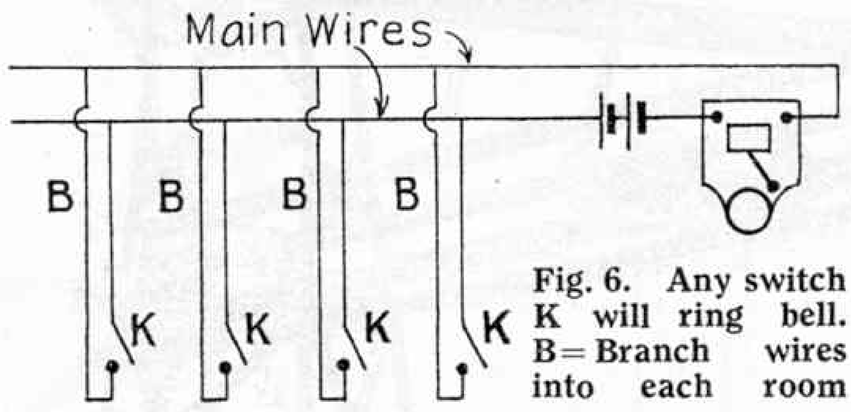


Fig. 6. Any switch K will ring bell. B = Branch wires into each room

In the indicator system, however, only one of the wires can be used as a main from which branches can be taken, the second wire from each push having to remain independent of all others until it has passed through the indicator. Each individual indicator consists of an electro-magnet with a very light armature to which is attached a brightly coloured card called a flag, which has a number printed upon it. Fig. 9 shows the wiring of such an indicator system with three bell-pushes and three corresponding indicators. When push No. 1 is pressed current will flow through the bell and round the electro-magnet of the indicator that has an armature with a No. 1 flag on it. This armature will be attracted to the magnet when the current is switched on and will remain attracted until pressure upon the bell-push ceases, when it will begin to swing to and fro like a pendulum and thus indicate which room has rung. When No. 2 push is used No. 2 indicator will swing, and so on. There is practically no limit to the number of indicators that may be used, and in large establishments such as hotels this system is invaluable.

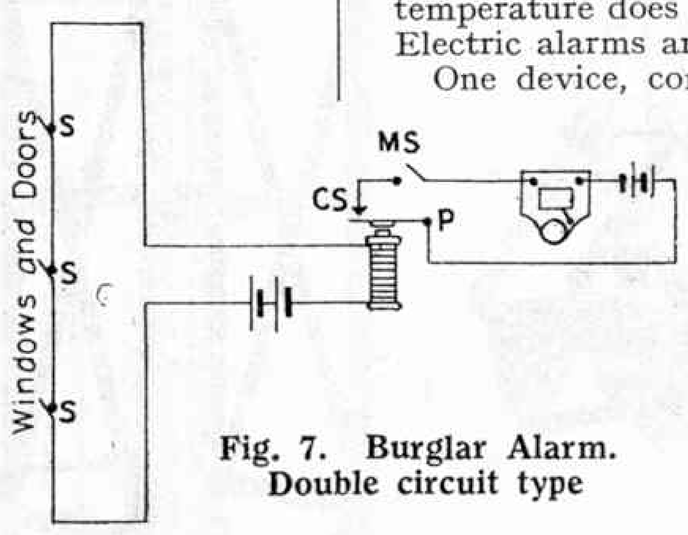


Fig. 7. Burglar Alarm. Double circuit type

Burglar Alarms

There are two standard systems for burglar alarms in regular use. The first only uses electric current when a burglar breaks in by opening a window or a door, while the second uses current continuously whether anyone is breaking in or not. It might seem that the first system would be the better in all respects, but it has the serious defect that if the burglar cuts any of the wires the bell ceases to ring, whereas in the second system the bell will ring no matter how many wires he cuts.

Fig. 8 shows the first and simpler system. On each window and door it is desired to protect a switch S is fitted, which remains "off" so long as the window or door is closed but comes "on" as soon as it is opened. The circuit is just the simple house circuit shown in Fig. 6, with special switches, and the addition of a main switch MS to cut off the current entirely when it is desired to open the windows or doors without working the alarm. As already pointed out, the great disadvantage of this system is that if any wire is cut by the burglar the whole arrangement is thrown out of action.

Fig. 7 shows the improved system. In this a number of closed switches are arranged in series, that is, connected so that the current has to pass through them all one after the other. In the same circuit is a battery and the electro-magnet of a relay. When everything is normal and all windows and doors are shut, current flows through the magnet of the relay, thus holding the armature A away from the contact screw CS. As soon as a window or door is opened the armature is released and the second circuit, consisting of a bell and battery, is completed by the armature touching the contact screw. As soon as the burglar gets inside the house he may promptly cut the wire he sees near the window he has opened, but still the bell rings, although usually it is too far away for him to hear it.

The relay, the bell and the second battery may be mounted on a small switchboard and locked up in the room where the person sleeps who is responsible for the safety of the house. In cases of extremely valuable property the second circuit may be in an entirely separate building such as a police station. This, of course, involves some loss of time in proceeding to tackle the burglar, but it gives a better chance of catching him because he cannot hear the bell and so take alarm and clear off. A main switch is enclosed in the second circuit so that windows and doors can be opened when desired without ringing the alarm bell.

Temperature Alarms

For many purposes it is necessary to maintain a room at one particular temperature, or at any rate to make certain that the temperature does not rise above or fall below certain fixed limits. Electric alarms are largely used where this is the case.

One device, commonly employed and called a "thermostat," consists of two thin strips of different metals, such as brass and steel, riveted together and suspended between two contact pieces. The two metals have different rates of expansion and contraction, so that a rise in temperature makes the compound strip bend over in one direction and a fall in temperature makes it bend in the opposite direction. When the rise or fall in temperature exceeds a certain limit the strip bends far enough to touch one or other of the contact pieces, and so closes the circuit and rings a bell in the ordinary way.

Another arrangement that serves the same purpose consists of a thermometer of the ordinary type, but having the top of the mercury tube fitted with an air-tight stopper. A wire is passed through this stopper, down into the tube as far as the mark indicating the temperature at which it is desired the alarm should sound. A second wire is connected with the mercury in the bulb of the thermometer and the free ends of both wires are taken to a battery, a bell being inserted in the circuit at some convenient point. When the temperature rises, the

(*Continued on page* 399)

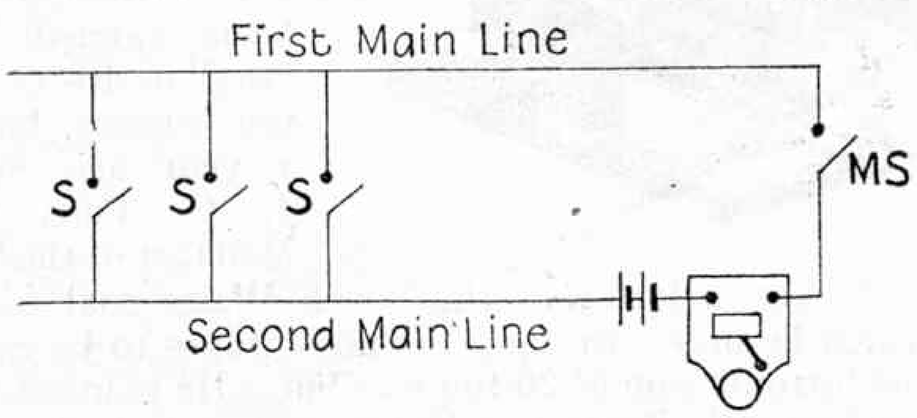


Fig. 8. Burglar Alarm. Single circuit type

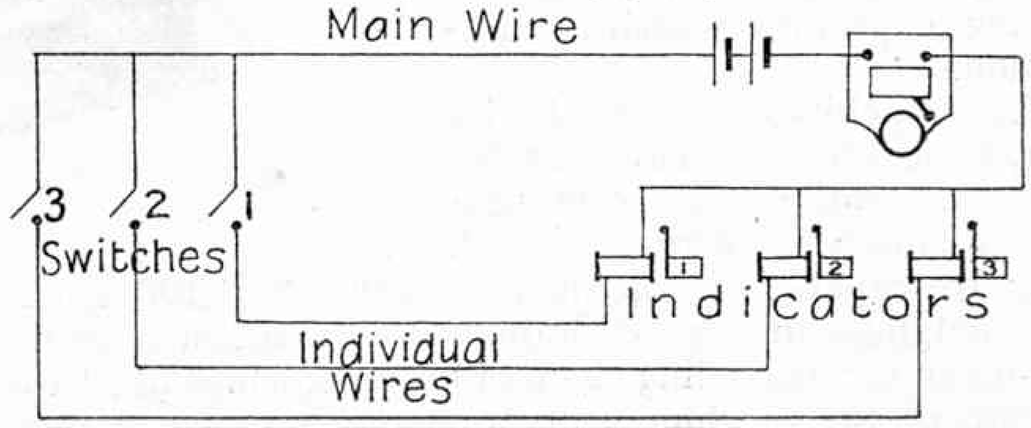


Fig. 9. Wiring for Indicator System

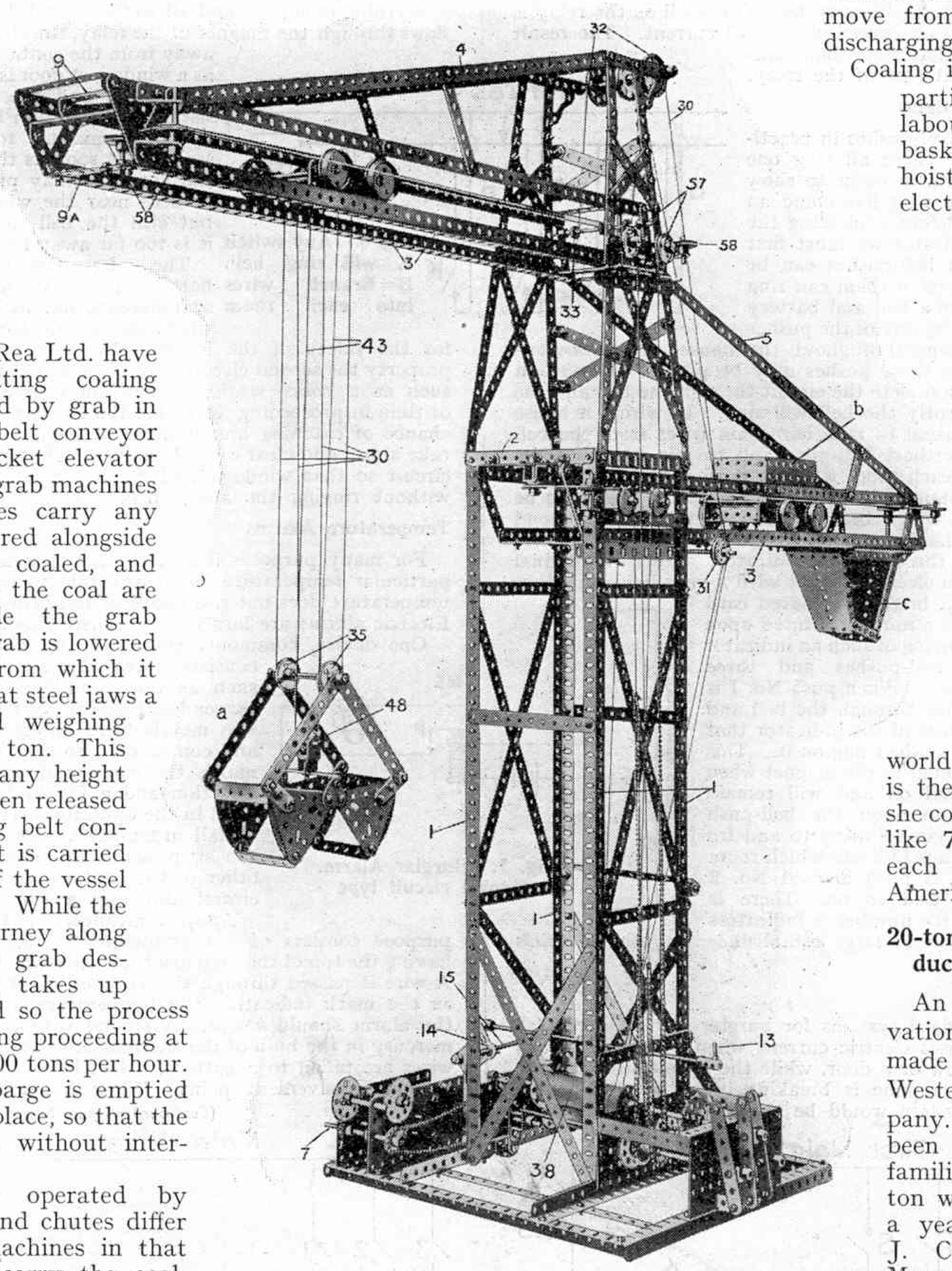
A NEW MECCANO MODEL

Model No. 734. Ship-Coaler

ONE of the most interesting features about a great port is the abundant provision made for coaling the never-ceasing stream of steamships that range in size from a small tug to a large passenger liner.

300 Tons per Hour

The method employed for transferring the coal from the quayside to the ship's bunkers varies according to local conditions and circumstances. At Liverpool, for instance, Messrs. Rea Ltd. have a fleet of floating coaling machines operated by grab in conjunction with belt conveyor and also by bucket elevator and chutes. The grab machines do not themselves carry any coal but are moored alongside the vessel to be coaled, and barges containing the coal are brought alongside the grab machines. The grab is lowered into the barge, from which it takes up in its great steel jaws a mouthful of coal weighing something over a ton. This coal is raised to any height required and is then released on to a travelling belt conveyor by which it is carried across the deck of the vessel to the hatchways. While the coal is on its journey along the conveyor the grab descends again and takes up another load, and so the process goes on, the loading proceeding at the rate of over 100 tons per hour. As soon as one barge is emptied another takes its place, so that the loading continues without interruption.



The machines operated by bucket elevator and chutes differ from the grab machines in that they themselves carry the coal. They are capable of holding from 1,000 to 1,100 tons. The coal falls in regulated quantities through a false bottom on to a travelling chain of buckets, which lift it to the top of the machine and discharge it down chutes directed either over the decks into hatchways or into side ports. By means of elevator machines coaling can be carried out at the rate of 300 tons per hour, and the coal can be delivered overall to a height of more than 50 ft., thus ensuring the speedy coaling of a large liner without the vessel having to move from her loading or discharging berth.

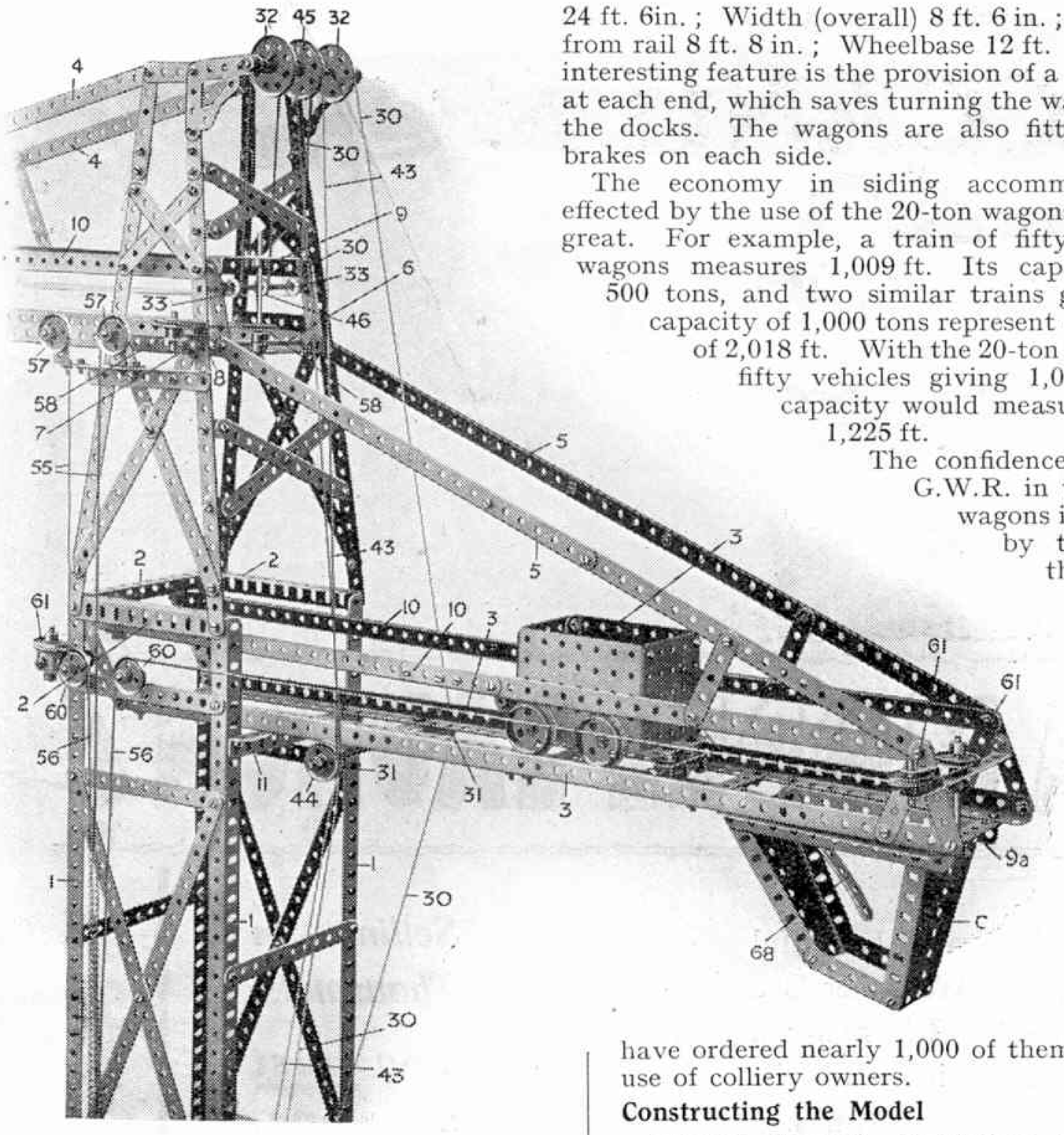
Coaling is also carried out partially by hand labour from barges, baskets of coal being hoisted by steam or electric winch barges alongside, or by stationary winches on the quayside.

By these various means vessels such as the White Star Liner "*Baltic*" have received 4,000 tons in one day.

To-day the largest and fastest liners burn oil fuel. The largest passenger liner in the world now burning coal is the "*Adriatic*," and she consumes something like 7,000 tons during each of her trips to America and back.

20-ton Wagons Introduced

An interesting innovation has recently been made by the Great Western Railway Company. Hitherto coal has been carried in the familiar 10-ton or 12-ton wagons, but about a year ago Sir Felix J. C. Pole, General Manager of the G.W.R., addressed a letter to the South Wales coal traders in which he urged strongly the advantages to be gained by the introduction of 20-ton wagons. He pointed out that the cost of building two 10-ton wagons was about 50 per cent. more than the cost of building one 20-ton wagon,



and that the introduction of the larger wagons would effect a considerable saving in the annual cost of wagon renewals. In addition to this, the necessity for the provision of more siding accommodation on the railway and at the collieries would be largely obviated. The first train of 20-ton wagons, 50 in number, reached South Wales in August last, and on the 27th of that month the first demonstration of their value was given at the Port Talbot docks, when several of the new wagons were tipped into an Italian steamship that was taking in a cargo of coal destined for Naples. Our illustration on page 419 is of special interest as it shows the first wagon being tipped on this occasion. All the loads were tipped without the slightest hitch and the demonstration was a complete success. During the next few weeks some 20 trains of the new wagons are expected to arrive in the South Wales coalfield.

Advantages of Larger Wagons

The dimensions of the 20-ton wagons are: — Length 24 ft. 6in.; Width (overall) 8 ft. 6 in.; Height from rail 8 ft. 8 in.; Wheelbase 12 ft. A very interesting feature is the provision of a tip door at each end, which saves turning the wagons at the docks. The wagons are also fitted with brakes on each side.

The economy in siding accommodation effected by the use of the 20-ton wagons is very great. For example, a train of fifty 10-ton wagons measures 1,009 ft. Its capacity is 500 tons, and two similar trains giving a capacity of 1,000 tons represent a length of 2,018 ft. With the 20-ton wagons, fifty vehicles giving 1,000 tons capacity would measure only 1,225 ft.

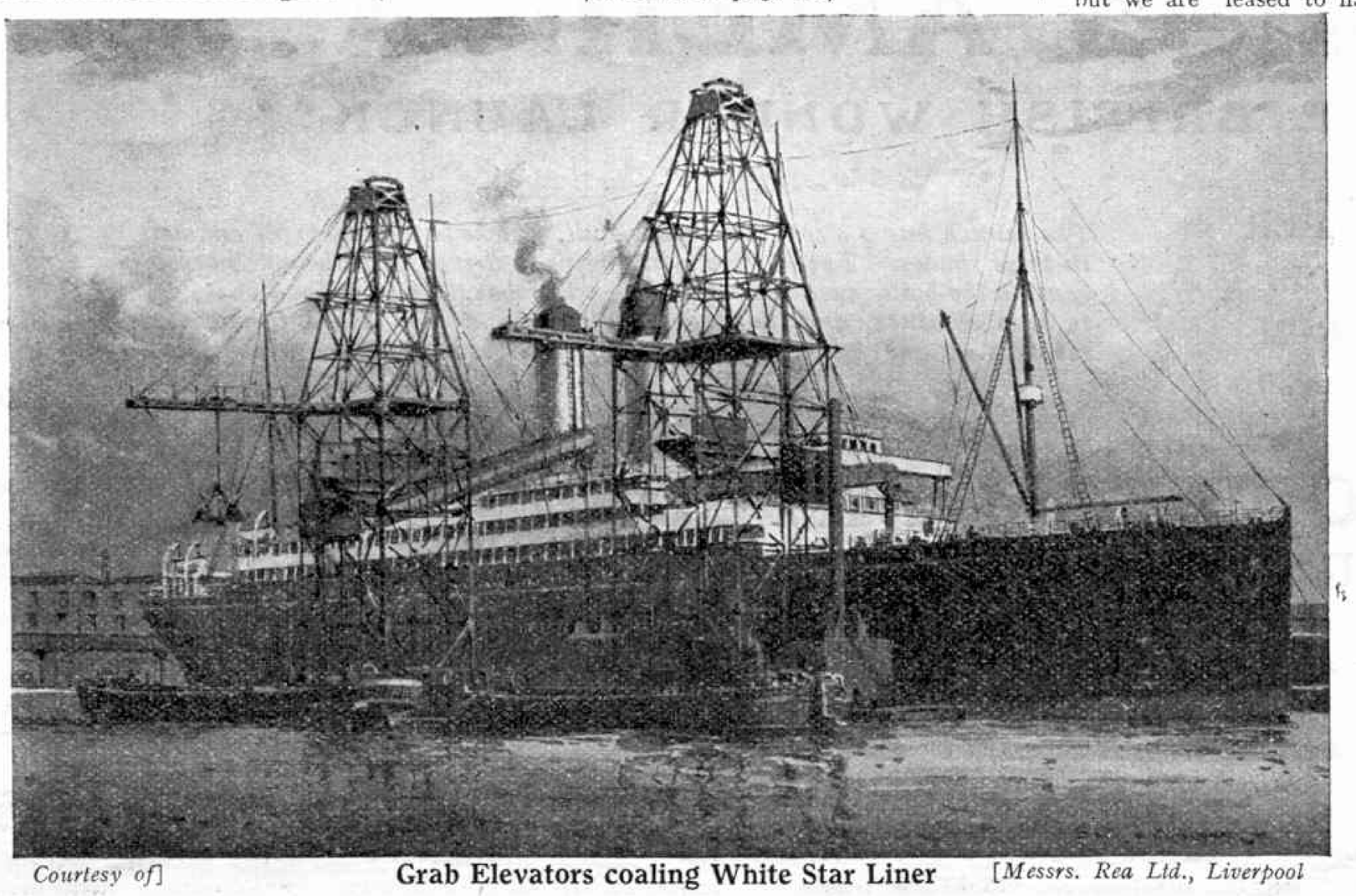
The confidence of the G.W.R. in the new wagons is shown by the fact that they have ordered nearly 1,000 of them for the use of colliery owners.

Constructing the Model

Having learned something of ship-coalers in general, let us now turn to the splendid Meccano model illustrated on these pages. To construct this model we commence by building the main tower, which consists of four 24½" vertical Angle Girders (1) braced at the top by three 5½" Angle Girders (2).

The runways for the grab and truck are formed of 24½" Angle Girders (3) upon the upper edges of which run the travelling wheels. The outer ends of the grab runway Angle Girders (3) are braced to the tower by two 12½" Strips (4), overlapped

(*Continued on page* 419)



Courtesy of] **Grab Elevators coaling White Star Liner** [*Messrs. Rea Ltd., Liverpool*



In this column the Editor replies to letters from his readers, from whom he is always pleased to hear. He receives hundreds of letters each day, but only those that deal with matters of general interest can be dealt with here.

Correspondents will help the Editor if they will write neatly in ink and on one side of the paper only.

W. Sharp (North Shields).—We were very glad to hear of your examination successes, and that our Book Review column helped you to select your book prizes. This is one of the objects for which this column was started. Your suggestion regarding photo-cards of great engineering structures is quite good, and we shall give it serious consideration.

W. F. Kaler (Otago, New Zealand).—We enjoyed reading your interesting letter. Your life seems to be very strenuous at present—up at 5 o'clock every morning, three cows to milk and then a 20-mile train ride to school! To boys living in our great English cities this sounds quite an adventure. Write again soon and give us more details of your life.

S. W. Leem (Peckham, S.E.).—Don't wait another eight years before writing us again! We have had many requests for a reprint of the "*Life Story of Meccano*," and we shall probably publish it again for the benefit of the thousands of new Meccano boys who join up every year. We quickly deciphered your code messages and we thank you for the kind wishes they convey.

J. Barton (Wood Green, N.).—Thanks for photo of your trio of dogs. We hope Bobby is more friendly than he looks. Sorry about the weather during your holidays. We had similar weather here, and it still continues! We were interested in your doings at the seaside.

Peter Keighley (Leeds).—We are always very sorry to hear of Meccano boys being in pain, and we hope you are better now. Write us again soon. We will consider your suggestion regarding the railway articles.

E. H. Medlucott (Bermondsey).—We believe there are very good reasons why every boy should know something of Astronomy, and we are very pleased to hear of your interest in the hobby. Your figures are remarkable, but every boy finds them in his school books, and they would be a little out of place in the "*M.M.*"

A. E. Davis (Boston).—We note that you have "Wembled" and that you enjoyed it very much. Each of the hundreds of boys who have written us of their experiences have told us that they liked the Palace of Engineering best, and that they spent most of their time there—which is quite what we anticipated! We are glad you think the "*M.M.*" has "gone from better, betterer, to betterest!"

I. Burstow (Redcar).—The little thing we did for you was scarcely worth a thousand thousand thanks, but we are leased to have them just the same!

R. Duff (Worthing).—Your suggestion for a Meccano Diary has been put forward by a number of readers during the past few months. We are giving the matter consideration and it may materialise some day. Your proposal that the diary should include pages on which Meccano boys could keep records of models built and invented during the year is quite good. It might be possible also to illustrate the diary by small reproductions of models. We shall be glad to receive any further suggestions for the contents and arrangement of such a diary.

G. Burrell (London, S.W. 19).—Your grievance regarding the number of advertisements in the "*M.M.*" is shared by many other readers, and we are in full sympathy with you. At the same time we want you to understand that without the revenue from our advertisements it would not be possible to publish the Magazine at all, on account of the extremely high cost of paper, printing, etc.

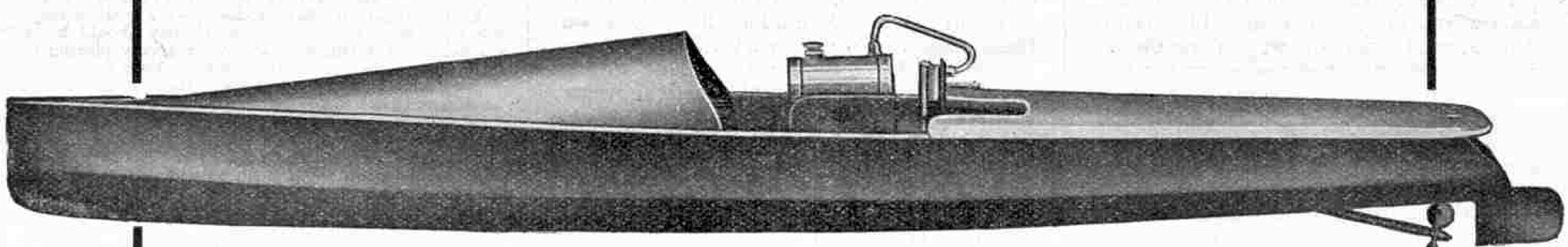


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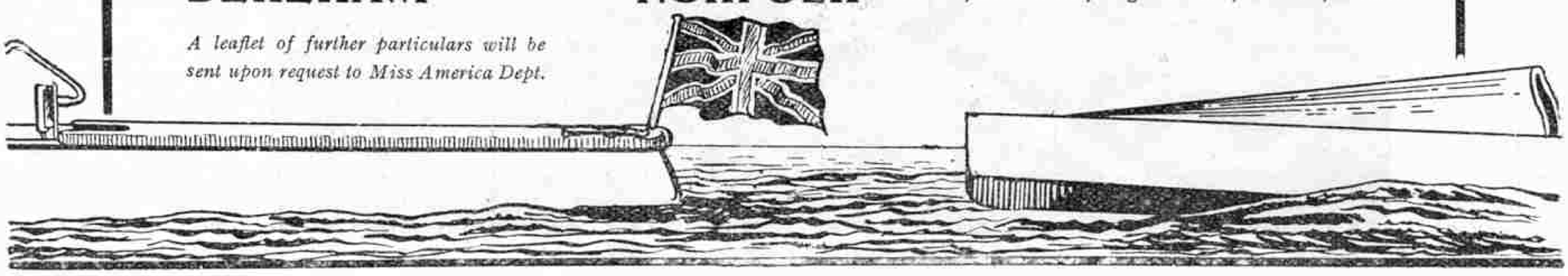
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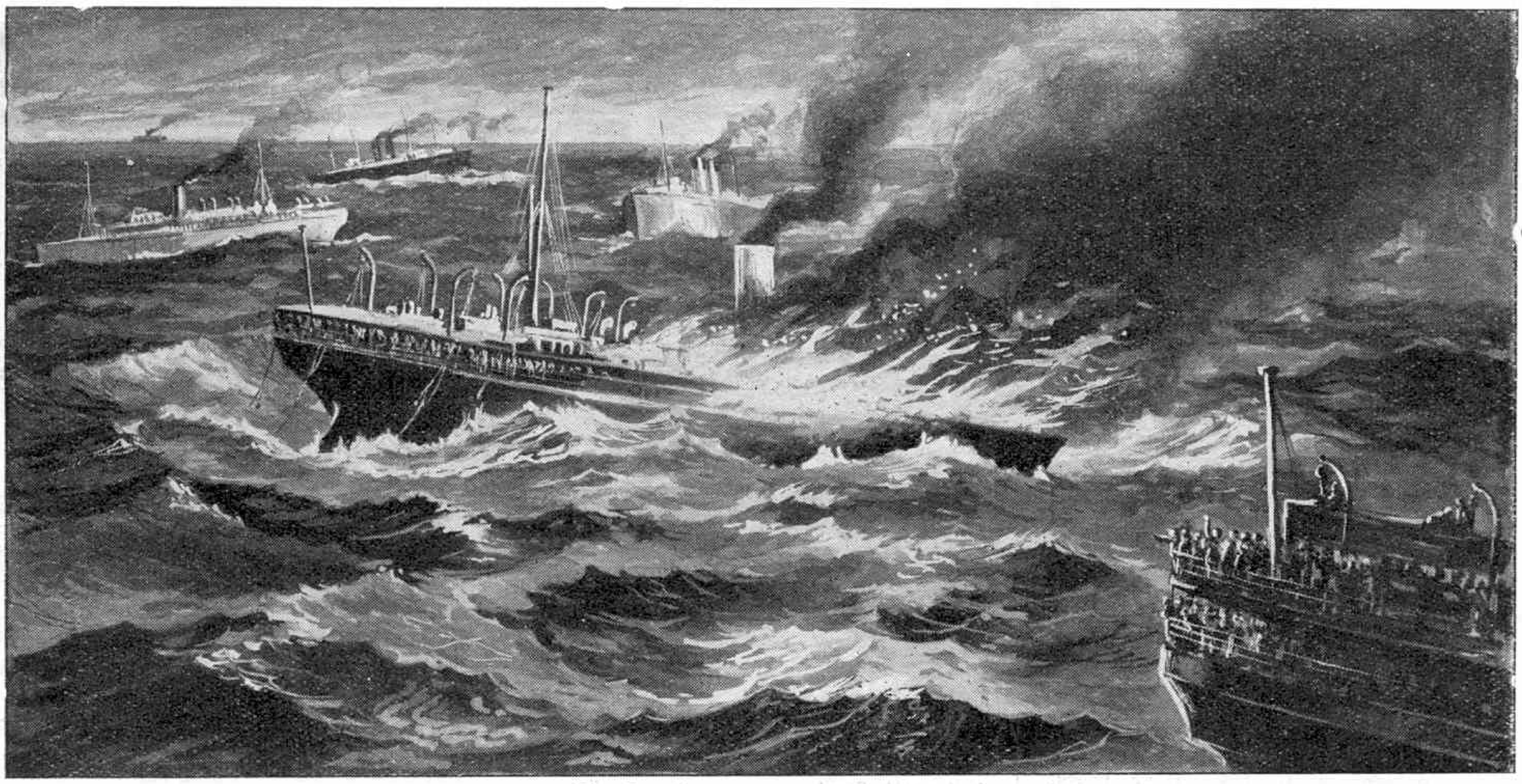
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A leaflet of further particulars will be sent upon request to Miss America Dept.



Saving Life by Wireless

How this Great Discovery Helps at Sea



The Burning of the "*Volturno*"

ONE of the first instances of wireless being used for life-saving at sea was when the ill-fated "*Titanic*" went down. This magnificent White Star liner, on her maiden voyage, sank at 2.20 a.m. on 15th April, 1912, and of the 2,224 people on board, 1,513 were drowned.

The "*Titanic*" was built on magnificent lines and represented the highest standard of British marine engineering. She was provided with a particularly elaborate system of water-tight compartments, and was regarded as being perfectly safe.

Steaming along unsuspectingly, the great vessel struck an iceberg, which tore a great hole in her bows. The fore-part of the ship quickly began to fill with water, and Captain E. J. Smith, who went down with his ship, at once ordered wireless signals of distress to be sent out. Unfortunately the operator on board the "*Californian,*" another liner only eight or ten miles away at the time, had retired for the night, so that the signals were not received by this vessel. The captain of this ship actually saw the rockets that were sent up by the "*Titanic,*" but he failed to realise the position. Had he done so, or had the "*Californian*" received the "*Titanic's*" "S.O.S.," many, if not all, of the lives that were lost could have been saved. Although the appeals for help were thus not responded to by the "*Californian,*" the "*Carpathia,*" 70 miles away, received the wireless call and hurried to the position given. When she arrived, however, she found that the "*Titanic*" had already gone down, but she was able to pick up some of those who had been fortunate enough to get into the boats.

The effect of the "*Titanic*" disaster was to hasten the compulsory installation of wireless on all liners, with an operator in attendance day and night, so that never again could distress signals fall upon deaf ears. A year later wireless efficiency and organisation had improved greatly, as was illustrated when fire broke out on the British steamship "*Volturno*" on 9th October, 1913. "S.O.S." signals were sent out and there was a remarkable response to the wireless calls for help.

On 2nd October the "*Volturno*" left Rotterdam for New York, carrying passengers—mostly emigrants—and crew to the number of 657, and the story of the rescue of 521 of those on board is most dramatic. The fire, which was the result of an explosion in the forward hold, started at seven o'clock on the morning of Thursday, 9th October, when the vessel was in mid-Atlantic. Soon afterwards frantic calls for help were sent out by the "*Volturno's*" wireless operator. These were received by the Cunard liner "*Carmania,*" which was 78 miles distant, and she steamed full speed to the rescue. At the same time she repeated the distress signal to all ships within range.

Twenty-four Hours on a Burning Ship

In the meantime those on board the doomed ship were fighting the fire and vainly attempting to launch boats. A furious gale was blowing, and as each boat was lowered it was smashed to pieces or sunk by the raging waves.

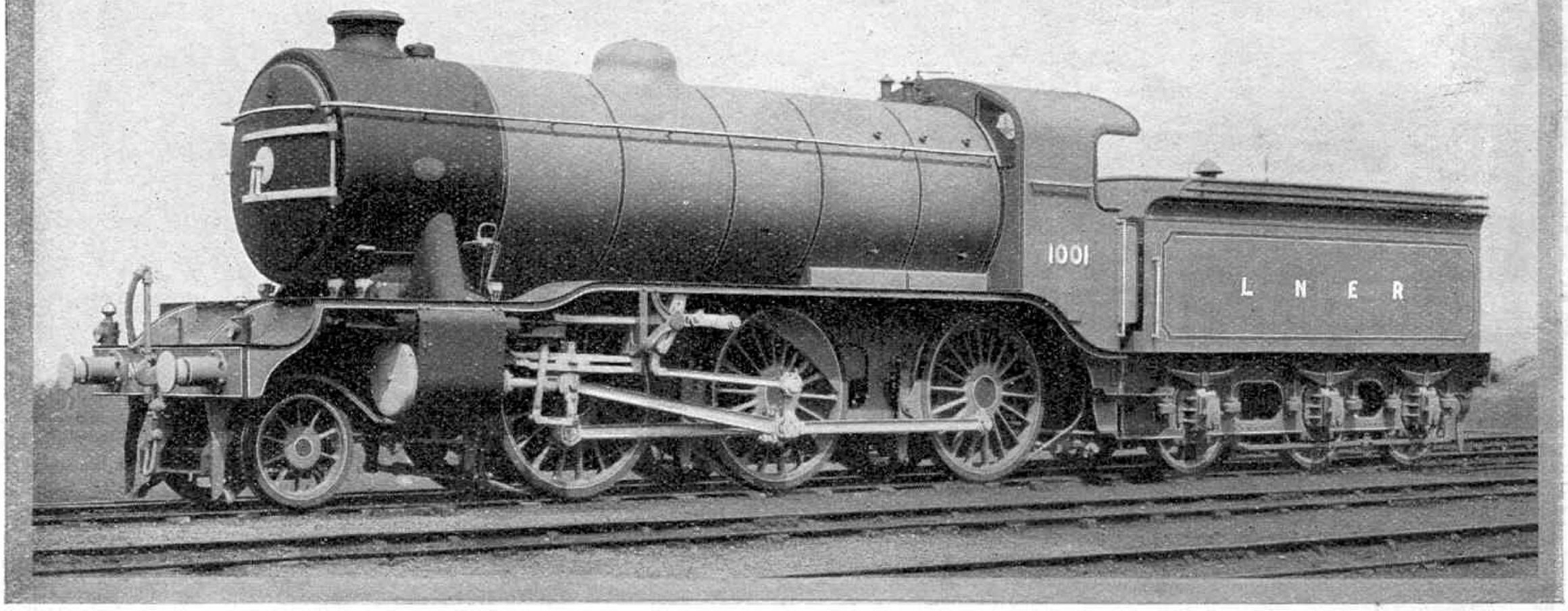
The "*Carmania*" reached the blazing vessel about noon, and shortly afterwards nine other liners arived. A heart-rending position now arose, for although wireless had brought help, it appeared as though the liners would be powerless to effect a rescue, on account of the fury of the gale. After great difficulty the "*Carmania*" succeeded in launching a boat and an attempt was made to reach the "*Volturno.*" No headway could be made against the gale, however, and three hours later, after breaking or losing all but three oars, the boat had to return to the "*Carmania,*" the crew being utterly exhausted by their efforts.

All this time the fire was slowly spreading and driving the 600 persons on board to one end of the ship. Night came, but the gale continued with unabated fury. The ten great trans-Atlantic liners stood by,

(*Continued on page* 419)

"S.O.S."—three simple letters, yet what pictures crowd into the mind on hearing them! A ship at sea, storm-tossed, sending out urgent messages for help. The terrified passengers crowding on deck; the sharp orders quickly obeyed; the lowering of boats, and last of all the sinking of the vessel, perhaps with some hapless souls still on board. All this and much more instantly flashes across the minds of those who hear those fateful signals—"S.O.S."

Driving an Express Train



Probably every boy at some period of his life has longed to be the driver of an express train. It is very fascinating to think of standing on the footplate of a giant locomotive hauling a long train across the country at 50 or 60 miles an hour, knowing that one is in complete control of that mighty force. We cannot all be engine-drivers, however, but every Meccano boy can know how these giant locos are driven.

OUR train is standing at the platform of the terminus, waiting for the passengers to take their seats. During this time the engine-driver and his assistant, the fireman, are not idle. They move about the loco with an oil-can and a piece of waste, attending to the lubrication of the many bearings. If it is a night run they also see that the head-lights are burning brightly. At the same time the fireman keeps the fire well trimmed, so that a steady pressure of steam is always maintained. When their preparations are finished and all is well with the engine, the driver and fireman climb back on to the footplate and await the signal to start.

Very soon the signal in front of the engine drops, indicating that the line is clear, but the driver does not start until the guard has given the "Right-away." At last the guard blows his whistle and waves his green flag. In reply, the driver gives a short blast on the steam whistle, to show that he is about to start, and then grips a lever that is in a position marked "Brake-on." Pulling this lever over he places it in the "Brake-off" position, a movement that causes a jet of steam to force the air out of the brake cylinders and pipes, thus releasing the vacuum brakes. The lever is now put over to "Running" position, which connects the brake pipes with an air-pump. This pump is worked from the engine and maintains a vacuum while the train is in motion. If this vacuum should be broken, air would at once be admitted to the brake pipes and the train would automatically come to a standstill.

A Smooth Start

Beside the brake lever is the gear lever, mounted in a quadrant. This lever is now pushed right forward, while the handle controlling the regulator valve is very gradually moved over. The valve opens and allows steam from the boiler to enter the steam-chest of the cylinders, from whence it is distributed by other smaller valves to either end of the cylinders. Here the energy of the steam is used to impart motion to the pistons, and this motion, transmitted through the connecting rod and cranks, forces round the driving wheels.

The driver must be careful to open the regulator valve very gradually in order to avoid a sudden jerky start. Apart from the discomfort that a sudden start causes to the passengers, it may also cause damage to the train. Sudden strains on the couplings will cause them to give way after a time, and the engine itself may easily be strained by the sudden in-rush of steam to the steam-chest.

The train now begins to move and gathers speed every moment, for although it has taken some time to explain the starting movements, in actual practice they take only a few seconds to perform.

The driver now makes certain that all the signals along the line are in his favour, and then, as he has a long run before him, he opens out the regulator a little more. In the meantime the fireman has been stoking up the roaring fire beneath the boiler. It is his duty to see that a certain head of steam is always maintained, otherwise the speed will decrease.

Stopped by the Signal

A glance at the speed-indicator tells the driver that the train is doing, say, 45 miles per hour. As this is the average speed he has to maintain so as to reach his destination on time, he pulls back the gear lever and reduces the opening of the valve very slowly. The train continues to travel at 45 miles per hour but now the admission of steam to the cylinders has been reduced to, perhaps, 17 per cent. of the piston stroke.

The train is now tearing along and is well up to time, but a few miles ahead there is to be passed a certain section of the track in which, according to all drivers' instructions, no train may exceed 30 miles per hour. Closing down the steam-regulator yet further, the driver watches the speed-indicator until it registers 30 miles per hour. The train then maintains this speed throughout the restricted section, but once it is passed the speed is increased to over 45 miles per hour in order to make up for the time lost and to keep the fixed average speed and get in to time.

Half-way to his destination the driver sees that a "distant" signal ahead is against him, indicating that the "home"

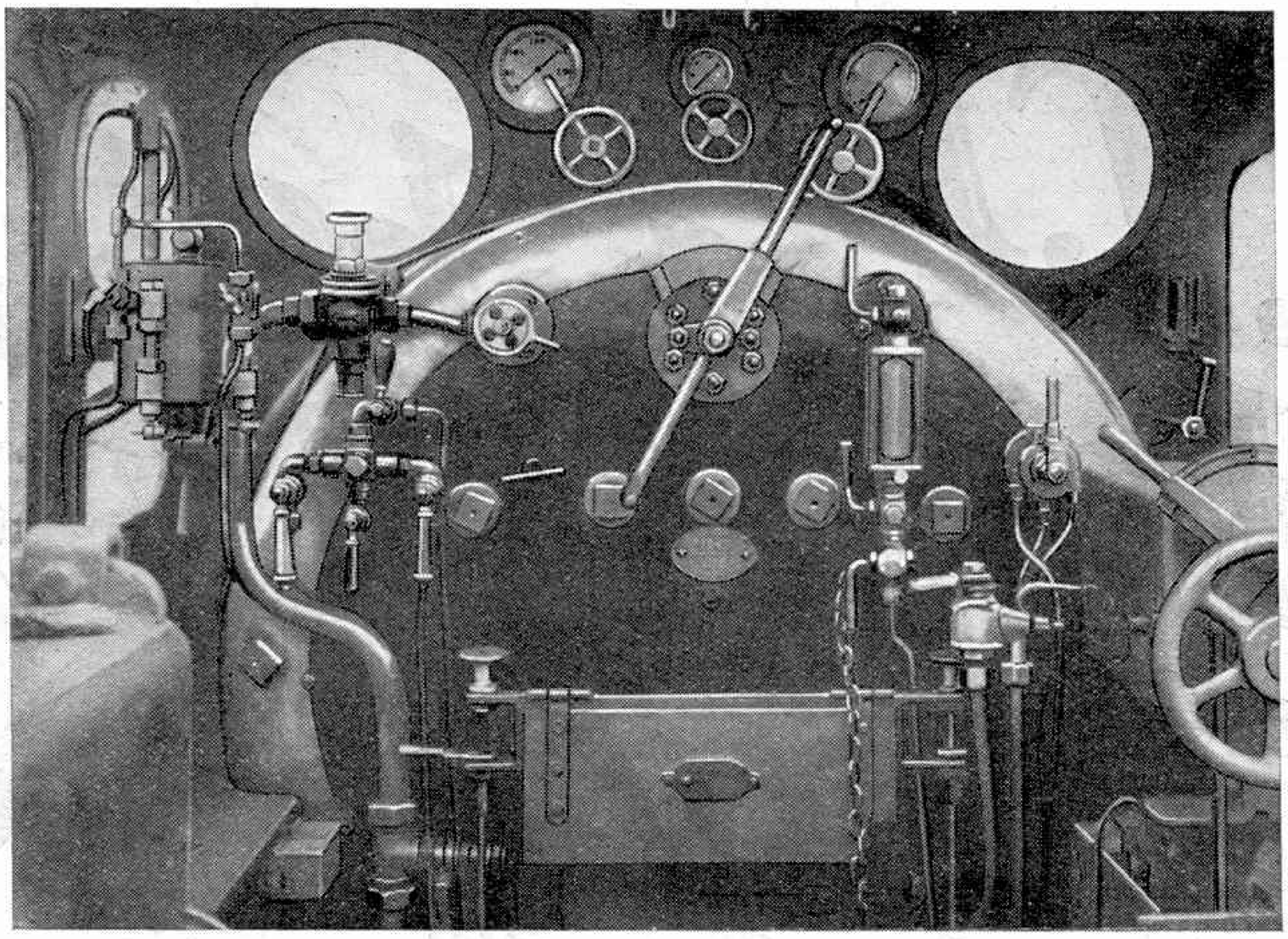
signal, perhaps half-a-mile further on, is also against him. Immediately slowing down, he allows his train to crawl along the line. If he were to stop altogether it would mean that valuable time would be wasted in starting the heavy train again, so he moves slowly along past the distant signal, hoping that the home signal will be down by the time he arrives at it. Just as he reaches out for the brake lever to bring his train to a complete standstill, the home signal drops and the line is clear once more. Now the lost time has to be made up, and opening the regulator, the driver lets the train gather headway.

Taking-up Water at Speed

The fireman bends to his task of obtaining the utmost possible heat from the coal he shovels in, and by means of dampers and the fire-hole door he regulates the supply of air to the furnace. Having stoked up, he turns to the gauge-glass, which shows the amount of water in the boiler. He sees that the water is running low and by means of a steam injector he fills up the boiler.

The train is now approaching a point where there is a long trough filled with water between the rails, and the graduated indicator shows that the water tanks require re-filling. A long iron scoop lies beneath the tender and this the fireman lowers by means of a hand-screw. As the engine flies along, the water in the trough rushes up the scoop into the water tanks, which are quickly filled without stopping the train.

The driver in the meantime has been watching the track ahead to see that all signals passed are in his favour and that the correct speed is being maintained.



The Interior of the Cab, showing Gauges, Levers, Brake and Fire-box

At length the destination comes into sight round a long bend, and with the signals down, the train has a clear run into the station. The driver closes the regulator and gradually moves the ejector handle away from "Running" position to "Brake-on" position. This opens the air valve leading to the vacuum in the brake pipes. Air enters the brake cylinders and forces up pistons connected directly to the brake gear, and the brake blocks are thus forced against the tyres of the wheels.

Carefully judging the distance at his disposal for pulling up, the driver lets his train run gently into the station, and then, with an almost unnoticeable check, brings it to a standstill. The guard glances at his watch as he alights from his van at the rear of the train and remarks "On time to the minute!"

Ten Minutes Slow—(*cont. from page* 377)

he crawl back over the engine. He gave a frightened shout, but the hiss of escaping steam smothered his voice. In the narrow space there was no place to stand except on the moving connecting rod.

The maximum speed at which the wheel ran never exceeded four revolutions a second, but that was fast enough to shake a man off the polished surface of the connector. Bert's brain worked quickly and in less time than it takes to write he realised that in three or four revolutions the shaft would be moving at full speed, and he pictured himself thrown off and crushed against the wall, or caught in the flying spokes of the big wheel.

He looked up despairingly. He could not climb back past the flying spokes. When the crank passed centre and swung downwards he felt as if the earth were dropping from beneath his feet. He gasped and threw out his hand to steady himself. The next instant he felt himself being lifted as the crank came upward to complete its first revolution.

Fearful that he might be thrown off when it again descended, he quickly shifted his position along the connecting rod and away from the crank. He moved three or four feet, keeping his balance by leaning backward and pressing his hands against the wall. In his new position the vertical motion was not so great. If he could hold on for only a few seconds, the engineer might hear his calls and shut off the steam before the engine reached full speed.

Again and again he shouted, but the noise of escaping steam, augmented now by the rumble of the slowly-moving machinery, completely drowned his voice. Meantime, the wheels gathered speed with every revolution.

A second seems a long period to a man face to face with what appears to be certain destruction. Bert tried to devise some way out of his awful predicament, but all that he could think of was the big spokes of the flywheel as they raced upward scarcely a foot in front of his face. At first he could count them, but soon they came too fast for that. He felt the current of air that the wide rim set in motion. Everything round him seemed to be dropping, indeed, the wheel was the only thing that moved upward, the way he wanted to go. Then suddenly a thought struck him—why should he not go up with the wheel?

The crank was again on the upturn; the wheel had almost completed its second revolution. The spokes were chasing one another upward faster and faster, in another second they would be only a blur.

Bert did not lose time in thinking over the plan that had come so suddenly into his head. It would be certain destruction to remain where he was; at worst he could only hasten the end by trying to get out now before it was too late.

He swung his arms round in front of him, and leaning forward caught the moving rim of the big wheel, and at once he was pulled off his feet. Although he felt as if his arms were being torn from their sockets he managed to keep his hold on the wheel.

He felt himself being hurled upward at unbelievable speed, for a wheel sixteen feet in diameter moves rapidly at the rim even when going at so slow a rate as one revolution a second.

He had not planned how he should get off the wheel when he reached the top. He realised that he must get off somehow, for if he held on he would either strike the edge of the floor or be crushed at the bottom of the pit.

Almost instantly he was at the top of the big wheel; he had just a fleeting glimpse of the floor as he rose above it. Lying with his chest across the wide rim, he let go and spread out his arms. Thrown off at a tangent, he sailed through the air like a flying squirrel and fell in a heap on the floor ten feet away.

Bruised and dazed, he sat up and got slowly to his feet. He could hear someone running toward him from the far end of the building. He staggered against a post and stood for a moment until his brain cleared. Then he drew his watch from the pocket of his overalls and set the hands forward ten minutes.

It was exactly one minute past one!

(The End).

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(*Concluded*)

LEAVING many other interesting things—the C.P.R. and the Canadian National Railway Exhibits, with their ingenious illuminated maps and the huge circular revolving table with its varied tableaux of Canadian life—I entered the Australian Pavilion. Here there are splendid displays of fruit and grain, and some wonderful models in butter of such objects as baskets of flowers, houses, cattle in the fields, etc. In the dairy section is the largest cheese ever made in Australia. It weighs 1½ tons and required over 3,000 gallons of milk to make it! Close to this section are specimens of different kinds of Australian fish, frozen in blocks of ice in huge glass refrigerators, and refrigerators containing frozen sheep and lambs.

Here, too, demonstrations are given every day showing the shearing of live sheep by electricity, and it is wonderful to watch the experts divest the sheep of their woolly coats in two or three minutes. A splendid model shows a panorama of a typical farm with cattle, horses, and men moving about on their appointed tasks in a most realistic manner. The men come down from the fields and disappear into the stables, while the horses bring carts laden with grain to the barns for threshing.

Fortune in Pearls

The trees in Australia must be very wonderful indeed, judging by some of the sections displayed here, and I think that even the largest of our trees in this country would be a dwarf beside the Australian giants.

I did not know before that precious stones and pearls came from Australia. Opals, for instance, are mined there, and one of the exhibits is a model of an opal-mine, every part of which is composed of tiny Australian opals of different colours. In a huge glass water-tank a diver was searching for pearls, and as I watched him I could not help thinking of the lines that someone (I forget whom!) wrote:—"A pearl-diver goes down a beggar but comes up a prince!"

In this connection there is on view a famous pearl—the "Southern Cross," composed of what seem to be about a dozen large pearls. These are welded together, as it were, in the shape of a perfect cross about two inches in length. They were found like this, and this "freak of Nature" is valued at £10,000!

Australian artists had painted wonderful pictures on some mother-of-pearl shells. The designs were suggested by the shape and the irregularities of the shell. One, for instance, was a group of flowers—with each petal raised and curled—another was a lady's head, with golden hair flowing



Photo by] [*Master M. Green*

The Beautiful Indian Pavilion

around. There were many other subjects too varied to mention, but a large green frog particularly took my attention. What a wonderful imagination the artist must have had to have seen the design of a frog in the shell, just because it had two tiny humps on it—which humps he had ingeniously used to depict the frog's bulging eyes!

With the Maoris

Before exploring the New Zealand pavilion I went through the wonderful Maori carved house, called "*Mata Atua.*" This is guarded at the entrance by two weird figures, and the walls and beams are all wonderfully carved with fierce faces and figures, which have big blue shells for eyes!

Everything in New Zealand seems to be very fresh and restful, and—as in the case of Australia—one of the strong points of the country seems to be the trees. Here, for instance, are New Zealand tree-ferns 10 ft. in height and a section cut from one huge tree that shows the rings of growth very clearly marked, so that you could easily tell the age of the tree from which it was cut. Not far away is a collection of splendid red-deer heads, and many beautiful varieties of New Zealand fish are shown in a refrigerating cabinet. Cauri-gum, agricultural seeds, minerals, and other products are also exhibited in a room that is decorated with large photographs of New Zealand scenery, life in New Zealand, and portraits of Maori chieftains.

Oxo, Toffee and Boot Polish

Passing New Zealand I entered the Samoan house, called a "*Fale,*" made of bamboo and leaves by natives. Not a single nail is used in its construction, the only fastenings being the "ties" of leaves and grasses. These are of such strength that, in their own country, these native houses endure for years.

Scattered about the Exhibition grounds are kiosks and smaller buildings, cleverly designed to resemble some article they are advertising and which is on sale within. For instance, what at first sight appears to be an 'out-size' in Oxo tins is really a little shop where you can have a cup of Oxo, while somebody tells you all about what you are drinking! Elsewhere a huge mischievous-looking parrot presides over a kiosk built to resemble a huge 'tin' of Sharp's Kreemy Toffee.

I had no idea of the work behind a tin of boot-polish until I saw the building that tells the story of Cherry Blossom. Apart from the manufacture of the polish itself, the mere packing of it is quite a big business. First the tins are cut and stamped from large sheets of metal by a machine. Then they are passed to another machine, where the little 'bevel' is placed around the side of each tin. Meantime, another machine is making the lids, and after the 'lip' has been pressed into the lids, the tins are filled—twenty at a time—and the finished product is ready for sale.

An Ancient Printing Press

In the "*Times*" building there was a printing-press 120 years old, printing the

"*Times*" as it was in 1805, word for word! Having bought a copy for 2d. I was able to read the reports of the Battle of Trafalgar and death of Lord Nelson! The man in charge told me that a good printer could turn out about 250 copies per hour on this machine—how very different from the modern press with its five-miles-long rolls of paper pouring out tens of thousands of newspapers every hour—each folded, counted, and with every page in its correct position!

In the Palace of Arts, another huge building, I found the Queen's Doll's House, and I learned for the first time that most of the details of this wonderful little model of a present-day mansion have been made by some of the most famous artists and craftsmen in Great Britain. It is complete to such items as central-heating, electric lights, telephone, wireless, and even umbrellas! Tiny oil-paintings hang on the walls of the various apartments and in the library are rows of tiny books actually written by their authors. In the garage I recognised a number of well-known cars, including a really topping model of a Rolls-Royce, as well as a motor-cycle and a bicycle. Furniture, carpets, ornaments, crockery, table-silver and everything that is found in a modern mansion was there—everything correct down to the minutest detail.

How an Englishman Became a Rajah

The Malaya Pavilion (which, incidentally, I heard someone call "Malaria!") is a splendid red, yellow, and black building, with a big dome and two tall towers. Here is represented a very different part of our Empire. I discovered that under British Malaya are grouped several territories of the Empire, some of the names of which I easily recognised as being "favourites" in my stamp album.

What a thrilling real-life adventure story centres around Sarawak! An Englishman, Sir James Brooke, set out in 1838 on a voyage of exploration and adventure in a small yacht of 140 tons. He took with him his nephew and a friend, with a boat-crew of nineteen. Reaching the East Indies he sailed up the Sarawak river and found the natives in the midst of a fierce rebellion against the Rajah Muda Hassim. In order to prevent more bloodshed and to restore law and order, Sir James helped the Rajah to quell the rebellion, and his efforts were so successful that to show his gratitude the Rajah offered Sir James the Government of Siniawan and Sarawak. Later, when the Rajah was deposed Sir James was offered the throne, and soon was proclaimed Rajah over 7,000 square miles. He lived for many years, developing the country, ruling the natives kindly but firmly, and suppressing piracy and riots.

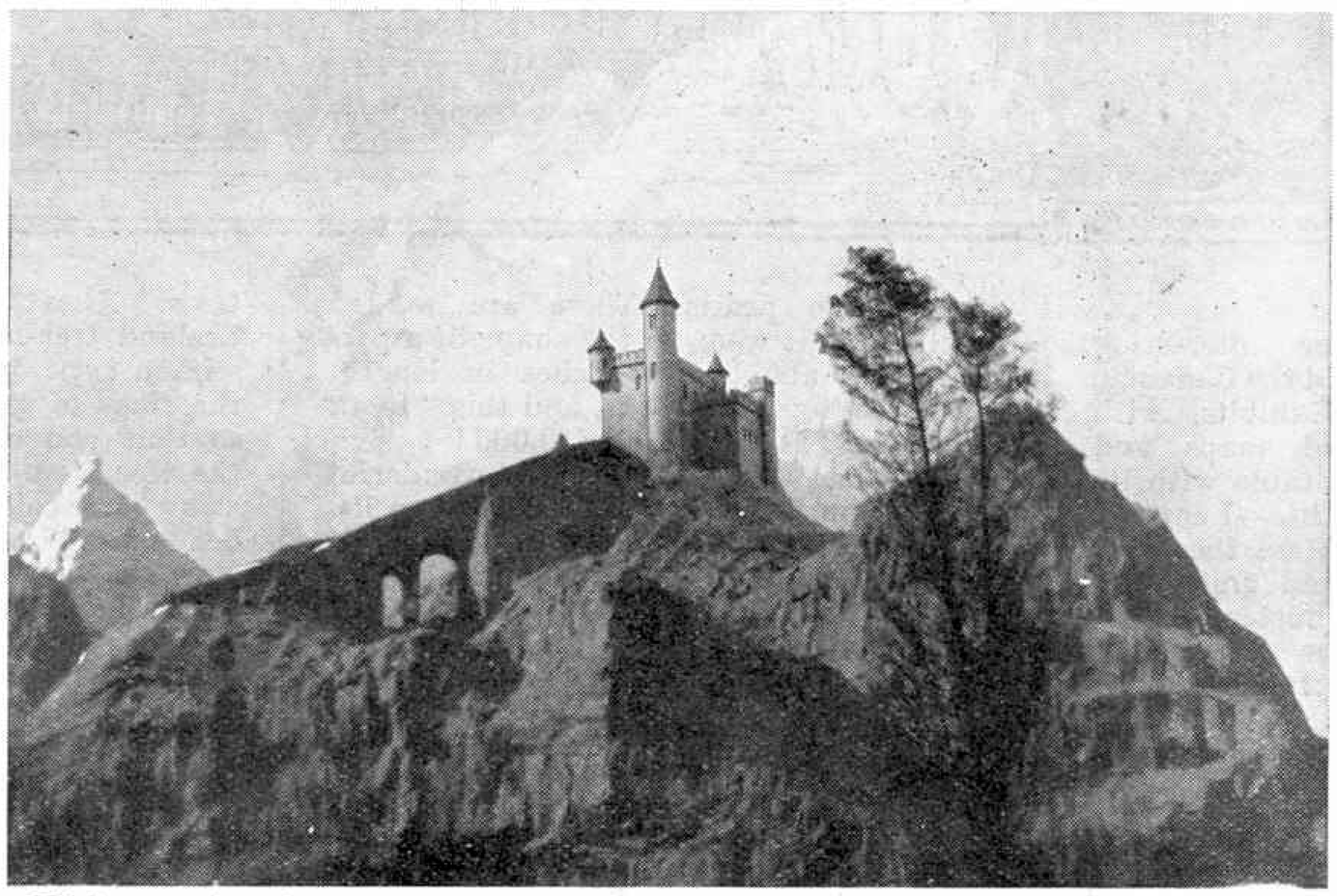
Down a Coal Mine

I next determined to visit the Amusement Park, but just before reaching it came upon the model Coal Mine, where I joined a party of visitors at the pit-head. A guide first showed us the machinery above ground, including the electric winding-drum, controlled by an operator sitting high up in a little seat above the machinery. We were shown how the coal, when brought to the surface, is washed and sorted by machinery, and we saw the working of the pumps, air compressors, and other important mining appliances.

Then we all crowded into the cages and were lowered to the bottom of the shaft, where we gained some idea of the immense amount of labour necessary to bring a piece of coal to the fireside. The underground pit-workings were complete with pumps, winches, first-aid appliances, telephone and signalling apparatus. Here, too, were the pit-ponies, seemingly quite content in their roomy stables so far below the green fields. I could not help feeling glad to learn, however, that machinery is slowly making them more and more unnecessary.

An Hour of Thrills

Coming up from the Coal Mine I found myself in the midst of a marvellous array of weird figures representing giants and animals, while all round were imitation mountains and caves containing all manner of attractions. It was the Amusement Park, the amazing thrills of which cannot be described—they can only be sampled! Here, for instance, I had my first experience of flying—in a captive monoplane. It was almost as exciting as a trip on the Giant Racer—an immense switchback that has a "run" of over a mile, with constant "ups-and-downs." On it the ground seemed to give way under our carriage every now and then and we were hurled downhill at such terrific speeds that we were only able to get our breath after we had reached the bottom and were slowly climbing the next hill! From the heights I had some fine "bird's-eye" views of the Exhibition. Half way up the "Gigantic," a monster scenic railway, is the notice "Mind Your Hats," and underneath is a row of what once were hats! Their torn and battered condition presented such a forcible argument that I hurriedly took off my own hat and held it until once more safely on earth!



This is not a view of some great historic castle but a photograph taken (by a reader of the "*M.M.*") in the Amusements Park, at Wembley. It shows some of the realistic scenery through which the Giant Switchback runs.

I had not had nearly enough excitement yet so carried on with more sensations. On the water-shute I dashed from a height of 80 ft. into the lake below, and in the "Whirl of the World" I was carried around in a small electric motor car that absolutely refused to move like any ordinary well-behaved car, jerking in all directions and quite beyond control! Of my many other adventures I can only say that the Amusement Park is a series of wonderful sensations, following on each other's heels as fast as they can, and it's tremendous fun!

Wembley is Better than School

It was now very late and I was thoroughly tired out, so decided to go home. I did so very reluctantly, however, being loath to leave this wonderful city—and it really is a city, for it has its hospitals and first-aid stations; its fire-stations, with engines and firemen ever ready for any emergency; its own gas, electric light and water supplies; and indeed everything that is found in a real city.

There were many buildings that I did not even enter, and many splendid sights I had missed, despite the twelve happy hours spent in the Exhibition. To me it was more than an Exhibition, however, it was a fairy city crammed full of all the most wonderful and most beautiful things on earth.

As I took a final look at India from one of the bridges spanning the lake, and watched the lights flashing throughout the grounds and in the buildings, I could not help wondering if it were not all a splendid dream, for it seemed impossible that such a wonderful place should exist only a few miles out of London! I had learnt more geography and history, and gained more knowledge in one day at Wembley, than I had done in a whole twelve months at school.

My only regret was that I could not share my pleasures with every other reader of the "*M.M.*," for I am sure that they would have thought, as I did, that they had seen the most wonderful sight that had ever been presented to the eye of any British boy.

Useful Stamp Album

Messrs. Stanley Gibbons Ltd. (391, Strand, London, W.C.2), whose name is familiar to stamp collectors the world over, have recently introduced an entirely new type of stamp album. Comprising 788 large pages and with spaces for nearly 12,000 stamps, the "Imperial" album is, without doubt, the ideal album for collectors specialising in the stamps of Great Britain and the Empire.

A great attraction of this new album is the fact that spaces for stamps are on one side of the page only, the opposite page being devoted to a clearly-detailed and fully-illustrated catalogue, corresponding with the numbered squares provided. The collector is thus able to quickly and accurately identify any stamp and to mount it in its correct position.

"Imperial" albums are strongly and artistically bound, and may be obtained in maroon or green bindings of either cloth or morocco. A postcard to the publishers will bring a specimen page and an illustrated leaflet to any interested stamp collector mentioning the "*M.M.*"

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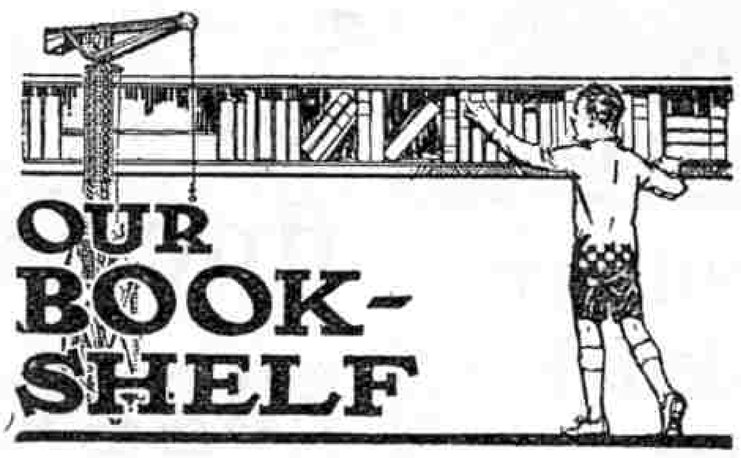
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For the Wireless Enthusiast

The astonishingly rapid rise of wireless telephony into popular favour has been accompanied by an equally astonishing output of literature dealing with the subject. The earlier wireless publications were in many cases far too involved for the amateur, and there has grown up a steadily-increasing demand for instruction books which, while being absolutely accurate, are clearly and simply written.

The latest publications issued by the Wireless Press Ltd. (12, Henrietta Street, London, W.C.2), certainly approach closely to this ideal. The first three numbers of the "*Ezi-Wiring*" *Series* (2/- each net), deal respectively with a 3-valve portable receiver, an ordinary 3-valve receiver and a 2-valve-and-crystal receiver. All these books may be strongly recommended to any amateur, whatever the state of his mechanical or electrical knowledge. The instructions are clear and the numerous working diagrams easy to follow. A distinctive feature of the wiring diagram is that the grid, plate, and filament circuits are printed in different colours, thus making confusion impossible.

From the same firm come also a revised and enlarged edition of Mr. F. H. Haynes's "*Amateur's Book of Wireless Circuits*" (3/6 net), a veritable encyclopædia of wireless information, and "*Uncle Jack Frost's Wireless Yarns on Good Reception*" (2/- net), in which Captain C. C. J. Frost discourses in a highly interesting manner on many wireless matters.

"The Empire Annual for Boys."
(B.O.P. Office. Price 5/- net, or cloth 6/- net).

This annual has lost none of the characteristics that have made it such a popular favourite, and indeed this year it appears to be more attractive than ever. It includes some thirty stories ranging from school life to adventures in the wilds of far-off countries, up-to-date articles on sport and travel and a number of interesting "how to make" articles that will appeal strongly to the practical boy.

"The Boy's Own Annual."
(B.O.P. Office. Price 12/6 net).

The "Boy's Own Annual" turns up year by year as though it intended to go on for ever, and indeed in the interests of boys throughout the Empire we hope it will go on for very many years. This year's volume is packed full of good things. The serial stories are particularly good and the practical articles dealing with various mechanical and scientific matters are well written and illustrated. For the stamp collector and the naturalist the Annual is a gold mine, and indeed one cannot imagine any boy who would not enthusiastically welcome it as a Christmas present.

"In the Land of Shame."
By Major Charles Gilson.
(B.O.P. Office. Price 5/- net).

One always welcomes books by Major Gilson, for he has the gift of writing a rattling good story, and nobody can deal with exciting situations in a more thrilling manner. "In the Land of Shame" is a story of central Africa, and the terrible conditions resulting from the slave traffic, and the almost perpetual native warfare, are well described. The author is at his best in the fighting in which the heroes of the book are concerned. The story ranges round the discovery on the shores of a lake in the African wilds of a plant from which a drug having remarkable medicinal qualities can be prepared, and the desperate efforts of a clever scoundrel to rob a doctor of the fruits of his discovery.

"Steamships. Their History, and their Deeds."
By G. Gibbard Jackson.
(B.O.P. Office. 5/- net).

It is not very long since Mr. Gibbard Jackson produced an excellent book on "The Railways of Great Britain," and he now repeats the success of that volume with a companion book on Steamships. Starting from the days before the coming of the steamship the author shows us the beginning of the White Star Line and the Cunard Line, and from that point traces the remarkable growth in the size and speed of steamships, culminating in such monsters as the "*Majestic*" and such greyhounds as the "*Mauretania*." A notable feature of this book is the high quality of its numerous illustrations, which have been chosen with discrimination.

"Conquest."

The November number of "Conquest" strikes an interesting note at the outset by an article on the relative merits of white bread or brown, from which we learn that, after all the heated arguments that have been brought forward on each side, "the bread is best that suits us best." Dr. W. Rosenhain discusses the baffling problems of how and why metals suffer from fatigue and break down, and other notable articles deal respectively with the Manchester Cotton Exchange, unloading a petrol ship, and some vanishing insects.

"The New Photographer."
(41, North John Street, Liverpool. 2d. Weekly).

Judging by the contents of the latest number, the interest and value of this paper increases steadily. This number (15th November) includes an interesting article on photography in the Sea-Water Hall in the Aquarium at the London Zoo, from which we learn that successful photographs can be taken there even with a comparatively cheap camera. Other practical articles deal with lantern-slide making, winter photography, flashlight photography, and buying second-hand apparatus. A valuable feature is the section devoted to criticism of beginners' prints, from which much useful advice may be gained. There are also the usual competitions, graded in such a manner that every photographer, whether beginner or expert, has an equal chance of winning a prize. The illustrations throughout the Magazine are excellently reproduced.

"Diaries for Schoolboys and Boy Scouts."
(Messrs. Charles Letts & Co., London).

The "Schoolboy's Diary" issued by Messrs. Charles Letts & Co. (price 1/6 cloth, 3/- leather) is quite a remarkable little production in regard to the ground it covers. Information of all kinds, varying from Latin verbs and mathematical tables to the latest sporting records fill the opening pages, and the diary for the year follows, each page having a foot-note portrait of some famous man and a few lines about his life. Last of all come a number of ingeniously arranged tables for marks gained in school, records of sports results, etc.

The "Boy Scout's Diary" (cloth 9d., leather 1/-, in refillable leather case with pockets and notebook, 3/-) contains information that is necessary to every Scout who takes his work seriously. There are hints on tracking, on recognising the different constellations, what to do in case of accidents, and a description and illustration of all the commoner British trees. The conventional signs and lettering used in field sketching are given, together with the most useful knots and details of signalling by semaphore or Morse code. Each page of the diary has a useful foot-note illustrating and describing something of special interest to scouts.

A Stamp Album Free

Messrs. Amber & Wright (33, Waveney Avenue, Peckham Rye, London, S.E.15) have sent us a specimen of the Postage Stamp Album which, as announced in our advertisement columns, they are offering free to our readers. The album contains 100 pages with a capacity of over 2,500 stamps, and is bound in a good stiff cover. Those of our readers who wish to obtain this handy little album should write at once enclosing 6d. to cover cost of postage and packing. They will not be under any obligation to buy stamps, but will be entitled to stamps from the firm's approval sheets to the value of 6d. as a refund of the postage paid for the album.

Fairycycles and Toy Motor Cars

The "Fairycycle" made by Messrs. Lines Bros. Ltd. (9, Fore Street, London, E.C.) is familiar to readers of the "*M.M.*," having frequently appeared in our advertisement pages. The latest designs surpass all previous models in strength, and are easy running and of smart appearance. Owing to their very low centre of gravity they are perfectly safe. The firm also make a luxurious toy motor car for the youngsters and it would be difficult to imagine a more realistic model. For the juvenile "speed merchant" of from 2 to 7 years there is a distinctly "sporty" model that will make a strong appeal to embryo motorists.

Miniature Lighting Dynamos

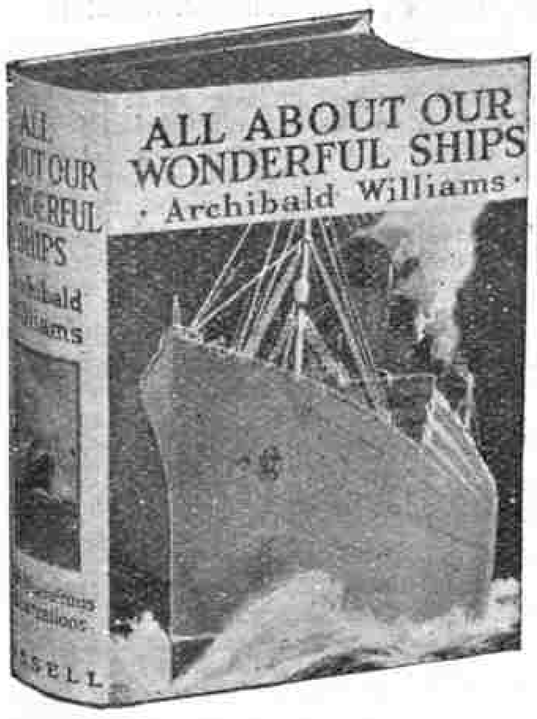
Those of our readers who are interested in electricity —and very few are not!—will appreciate the Miniature Lighting Dynamos supplied by Messrs. Greens (85, New Oxford Street, London, W.C.1.) Despite their small size these dynamos are very efficient and little power is required to drive them. Every machine is tested before despatch and is fully guaranteed.

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During the dark winter evenings a small portable light that can be carried about to any part of the house is always useful, and the "Beam" Lighting Set manufactured by A. W. North (47, Parchment Street, Winchester) is specially designed for this purpose. The set consists of a polished wooden base carrying a battery and a small bulb, together with a reliable switch. An interesting feature is that the switch is luminous and can easily be seen in the dark, a decided advantage when the set is placed by the bedside for use during the night. The whole set is well made and finished, and the battery and bulb can be replaced by new ones if required.

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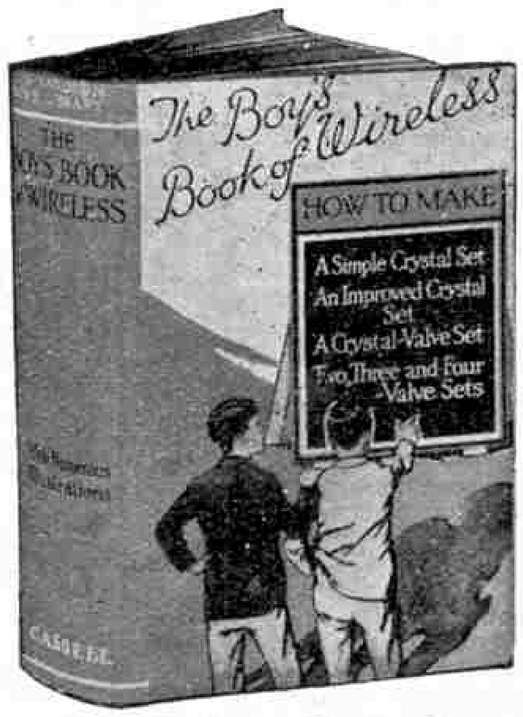
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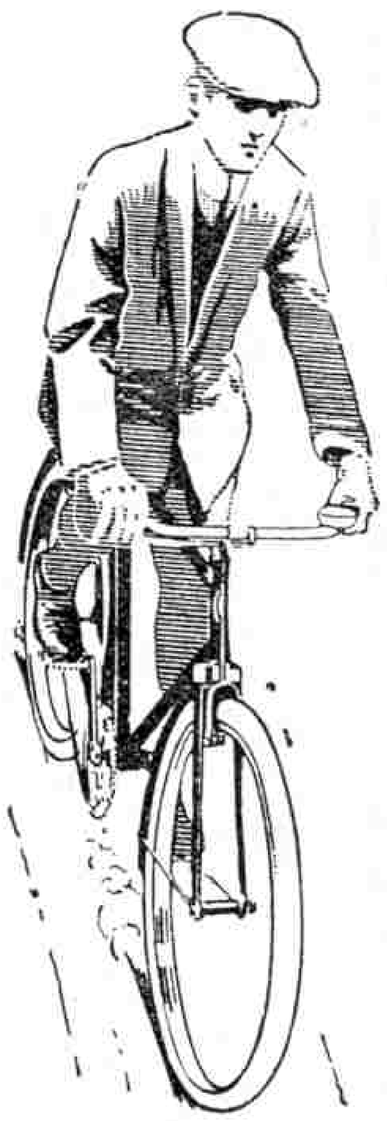
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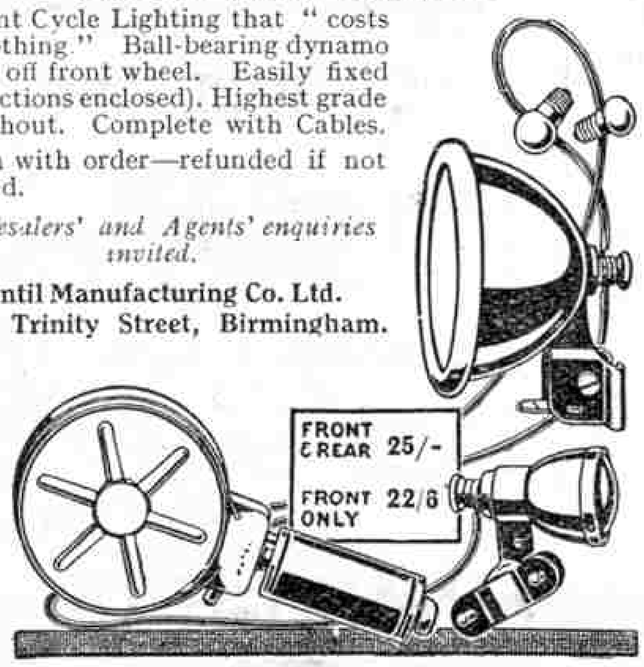
The World's BEST Lighting Set.

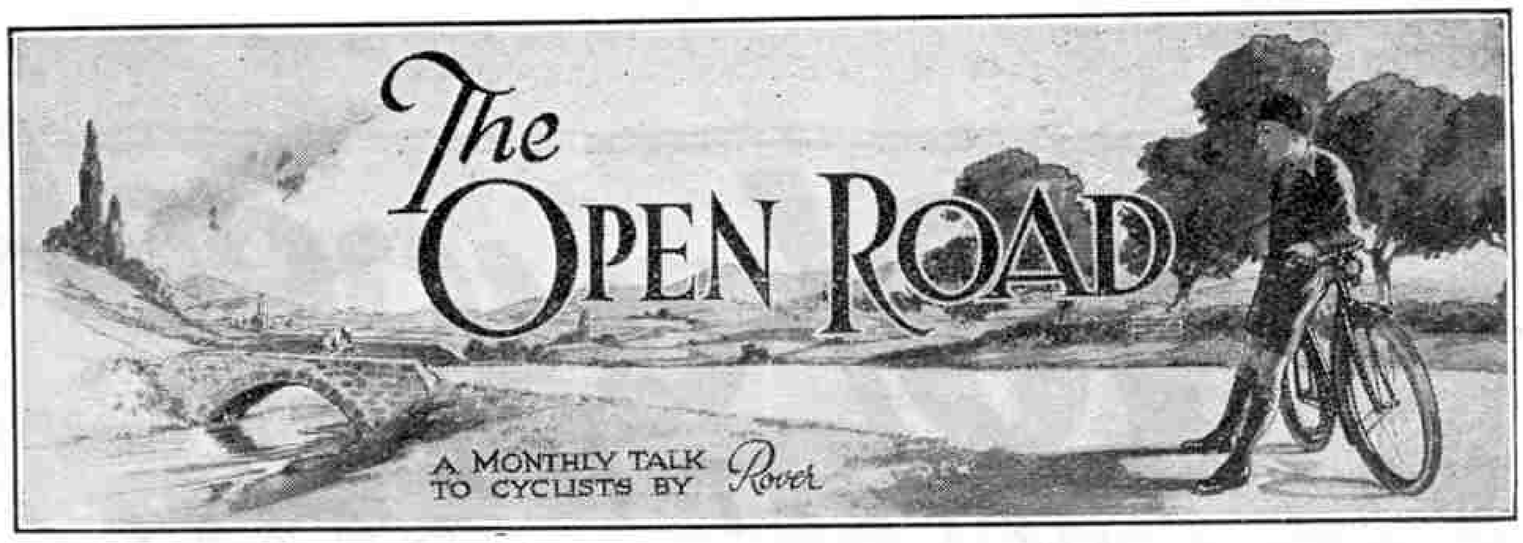
Brilliant Cycle Lighting that "costs you nothing." Ball-bearing dynamo driven off front wheel. Easily fixed (instructions enclosed). Highest grade throughout. Complete with Cables.

Cash with order—refunded if not satisfied.

Wholesalers' and Agents' enquiries invited.

Montil Manufacturing Co. Ltd.
Lower Trinity Street, Birmingham.





X. CHOOSING A BICYCLE

WHEN Christmas Day has come and gone, no doubt many Meccano boys will have realised one of their greatest ambitions—to possess a bicycle! They will become recruits to the ever-growing army of road-users, and as they set out on their first ride, they will be initiated into the joys of one of the finest and most popular outdoor sports in the world. As many of these prospective cyclists will select their own machines, a few words this month on the choice of a mount will perhaps prove helpful.

Far too many boys, in their enthusiasm and excitement, are content to purchase any sort of bicycle, as long as it boasts two wheels and a driving mechanism—quite regardless as to whether it is suited to their requirements or not! Once inside a cycle-store, and surrounded by machines of every kind and description, the making of a final choice becomes a very difficult matter indeed, unless you have already made up your mind as to the particular type you require.

The "Roadster"

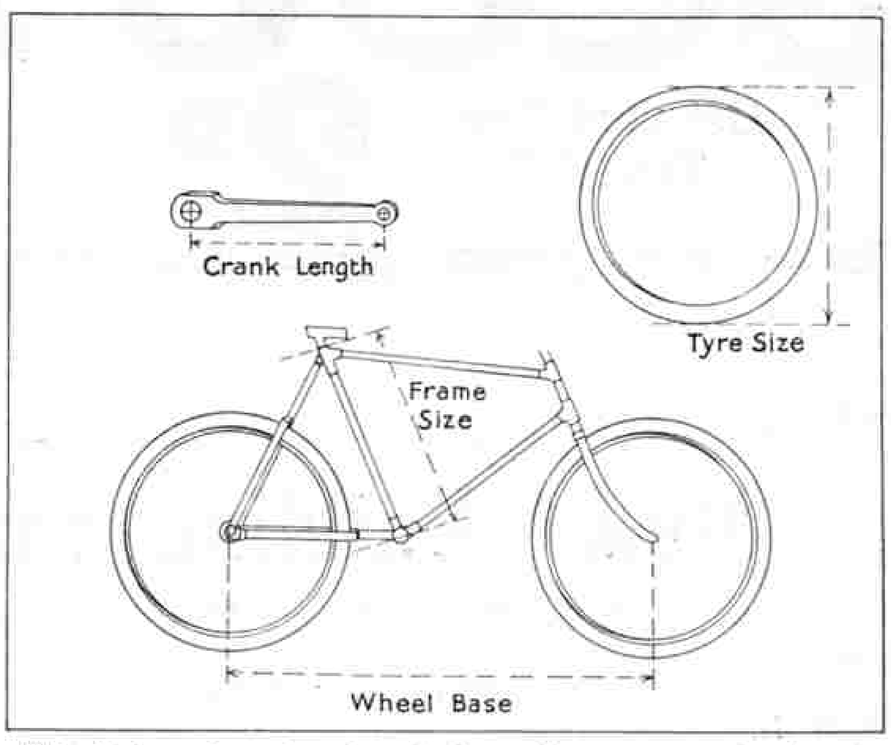
First of all it should be remembered that bicycles are divided into two main groups, the racing machine and the roadster. The difference between the two is well defined, for one is built for speed alone, while, in the other, attention is given to the comfort of the rider. The roadster is, of course, the more popular model of the two and is specially suited to long-distance touring and all-weather riding and is fitted with a comfortable saddle. Some machines are also fitted with oil-bath gear-cases and variable hub—or bracket-gears, which help to ensure easier riding. Cycles of this type are termed "super" or full-roadsters.

Racing Mounts

Then, still in the roadster class, comes the "light-roadster" which, in reality, is a combination of the two groups. Both the comfort of the roadster and the speed of the racer are found in this machine, and consequently it is an ideal mount for the rider who desires a speedy machine, yet does not wish to sacrifice comfort to obtain it.

The racing-cycle, or "road-racer" as it is usually called, is a very much lighter and speedier machine than any roadster, and should only be purchased by a rider who intends to join a cycling club in which fast runs are regular events. The racer may also be converted into a very useful mount for competition work by using lighter and livelier wheels. There are several other types of racing mounts which are of interest only to the experienced enthusiast or track-rider.

CYCLING MEASUREMENTS



This diagram shows how to make the cycle measurements referred to in this article

"Ready-Made" Cycles

Presuming that the type of machine required, roadster or racer, has been decided upon ; the next point to be considered is the frame specification. Few people realise that a cycle, if it is to give satisfaction, must "fit" the rider, and although it is too expensive an undertaking to have cycles "made to measure," the chosen machine should be as good a "ready-made" as possible. To ensure this you should measure the height of the frame, that is to say the distance from the top of the seat lug to the centre of the bracket spindle (see illustration). Then subtract nine inches from the length of your own leg, measured from the fork to the heel of your shoe, and the result should correspond with the frame height. If the frame proves slightly on the small side it is not of any great importance, but on no account should it be even an inch too long.

Wheelbase and Handlebars

The shape of the frame itself is not of great importance, for it usually follows an accepted design that ensures comfort and the necessary strength to withstand shocks and strains. Comfort and steady running depend a great deal on the wheelbase, which is the distance between the

(*Continued on page* 399)

10/- a week POCKET MONEY for a year



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Box O.	Plans, etc., for 6 Models		2/-
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,, 3.	,, ,, 49 ,,		17/6
,, 6.	,, ,, 71 ,,		37/6

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HOW MANY TIMES ARE YOU ASKED—WHAT DO YOU WANT FOR CHRISTMAS?

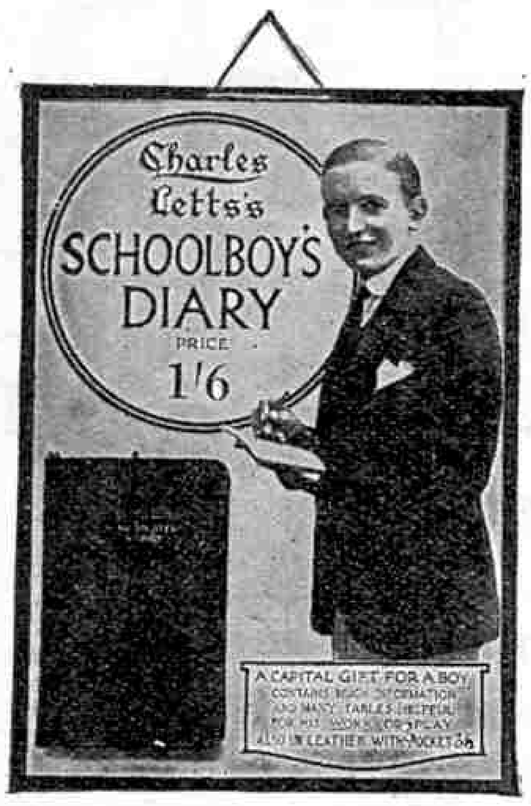
The answer, of course, is

Charles Letts's

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Contains the only comparative list of

PUBLIC SCHOOL SPORTS RECORDS.



This invaluable book contains, in addition to a complete Diary, a mine of helpful and necessary information, beautiful pictures, special pages for recording sports results, pocket money, time tables, marks, notes, matches and scores, etc.

A delight and a boon to any schoolboy, and a present which will last a whole year.

Price:
In leather cloth and pencil,
ONE SHILLING AND SIXPENCE;
In fine quality leather with pockets and pencil,
THREE SHILLINGS.
Size $5\frac{3}{4} \times 3\frac{1}{2}$ inches.

OF ALL
Stationers and Booksellers.

The Open Road—(*continued from p.* 397)

centres of the spindles of the front and rear wheels, and in a roadster this measurement, which is illustrated in the diagram on page 397, should not be less than about 43 inches. A long wheelbase is a standard feature of nearly all present-day roadster models, and this measurement is not of great importance unless a racing machine is being purchased.

Handlebar design is another point that sometimes presents difficulties to the new rider, and as the handlebars affect the riding position, they should be chosen before the saddle. Upturned or flat handlebars are nearly always fitted to roadster machines, as they allow of an upright riding position. There is little difference in the advantages to be obtained from either type, as it is always possible to raise a flat bar to a comfortable height. Handlebars with an upward bend, however, are generally popular, as they present a more graceful appearance.

On racing machines dropped handlebars are indispensable, as the stooping position they give reduces wind resistance and allows greater power in pedalling, particularly when hill-climbing. In roadsters the grips themselves should be behind the handlebar stem so that they may be reached without undue stretching from the normal upright riding position. Their width, which is measured in a straight line between the centre of the grips, should be between 18 to 20 inches, and care should be taken that they are sufficiently wide to guard against contraction of the rider's chest. Their correct position in relation to the saddle will be found to be anywhere between an inch below and above the saddle level, the most suitable position being found by practical tests.

Crank Length and Accessories

Crank length is another important consideration, and the most popular is $6\frac{1}{2}$–7 inches, though short riders would be well advised to have cranks nearer 6 inches in length. The advantages of a variable gear were fully explained in the September "*M.M.*" and there is no doubt that an accessory of this type adds considerably to the pleasures of cycling and also ensures easier riding.

In regard to other necessary accessories, such as tyres, saddles, lamps, etc., no set rules can be laid down for their selection, but they may safely be chosen without specialised knowledge, provided a reputable name is insisted upon.

NEXT MONTH:—
CARE OF BICYCLES IN WINTER

"Rover's" Replies

H. Dewhurst (Nelson).—We are glad to hear you are such a keen cyclist and the proud owner of a B.S.A. machine. We have sent you a list of articles required for a tool kit, which subject has been dealt with in a recent article on this page.

J. Banner (Mansfield).—The preparation we recommend for re-enamelling your bicycle is either Robbialac or Judge Brand enamel. Both give excellent results and we are asking the manufacturers to send working instructions to you.

E. Hall (Gainsborough).—A mechanic is not required to fit a cyclometer on your machine. This is quite a simple matter which you should be able to carry out in a few minutes from the directions given by the makers.

M. Morris (Hull).—Cycling maps for your district may be obtained locally, but for touring maps you should apply to Temple Press Ltd., 7–15, Roseberry Avenue, London, or Geographia Ltd., Fleet Street, London, either of whom would supply you.

A Cycling Correction

On the Cycling Page of the October "*M.M.*" we printed an illustration showing the method of fixing a cyclometer on a bicycle-wheel. Through a slip of the pen it was stated that cyclometers are usually fitted on the left-hand side of the wheel-spindle, whereas of course, all cyclometers are invariably fitted on the *right-hand* side. Were an instrument to be fitted on the left-hand side the figures would not only be invisible to the rider, but the mechanism would also work backwards.

Electricity—(*continued from page* 385)

mercury expands and moves up the tube. At the critical temperature it touches the wire that comes down through the stopper, thus completing the circuit and sounding the alarm. This mechanism only indicates a rise in temperature, but by making the thermometer tube in the shape of a letter "U" an alarm may be given also when the temperature falls below a pre-arranged point.

Automatic Fire Alarms

In order that advantage may be taken of the alarm given by either of the preceding mechanisms, it is of course necessary that an attendant should be at hand to take steps to regulate the temperature and bring it once again within the limits of safety. In some cases such attention is not possible, however, and it then becomes necessary for the whole process to be entirely automatic. This can be accomplished without much difficulty by arranging matters so that the closing of the circuit, in addition to—or instead of—ringing the bell, turns on or off a lamp or adjusts a stove, and so automatically maintains the room at a constant temperature.

Either of the preceding arrangements may be used also as an automatic fire alarm. The only difficulty in this lies in making the apparatus sufficiently senstive to give prompt warning of an outbreak of fire, and yet not so sensitive as to give a false alarm when the temperature of the room or workshop rises slightly above the average, as may be the case during a very hot summer.

Don't Be Let Down By Punctures

Use FIBERMETIC for your Cycle or Motor Cycle Tubes, and you will NEVER be let down on the road by PUNCTURES. Instantly stops all air leaks up to $\frac{1}{8}$th inch. Entirely non-injurious to rubber and does not choke up valves. Never goes bad—Never stops functioning.

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FIBERMETIC—The Permanent Puncture Seal—is sold in Tins 1 lb. 3/6, 2 lb. 7/- Post Free. Please state if for Cycle or Motor Cycle Tubes. Write for full Descriptive Pamphlet. Trade Enquiries Invited.

THE FIBRINE SALES LTD. : Embankment Chambers, 19, Villiers Street, Strand, W.C. 2.

Ask Daddy to get you one of these Toys—*they are just like the 'grown ups' use —only smaller—*

The "Fairycycle"

The Fairycycle or Children's Bicycle, makes a splendid present for you. It will keep you amused for hours—and keep you fit. Having a low riding position it is extremely safe and easy to ride. Be sure you get a *real* Fairycycle though. Look for the triangle trade mark on the frame, and make sure it has a brake and free wheel. No cycle without this trade mark is a genuine Fairycycle, and no others are nearly as good.

59/6



SPECIFICATION :
Adjustable plated handle-bar, cycle saddle (adjustable), ball-bearing rubber pedals, 12 in. wheels with $\frac{5}{8}$ in. wired-on tyres, frame of solid drawn weldless steel cycle tube, brake and free-wheel.

21/-



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The Secretary's Notes

By the time these notes are in the hands of my readers the close of the First Winter Session will be in sight, and we shall be turning our thoughts to the prospects of the New Year. The halfway line between the two Winter Sessions affords an excellent opportunity for "taking stock," as it were, of a club's progress, and it is a good idea to have a special meeting of all the members, presided over by the Leader, for this purpose. At this meeting the various items of the programme of the past session should be reviewed one by one and to each this test should be applied :—"Has this item proved a popular success with the majority of the members?" If the answer is "Yes," then the item should be continued. If on the other hand the meeting considers that the item has fallen flat and aroused no enthusiasm or interest, then one of two processes must be adopted—either the item must be dropped altogether, or it must be revised and modified so as to get rid of its unpopular features, and then be given another trial. It should be remembered that nothing is more likely to kill the enthusiasm of the members than the continuance in a club's programme of items which, while they may interest a few, are unpopular with the majority.

"Taking Stock"

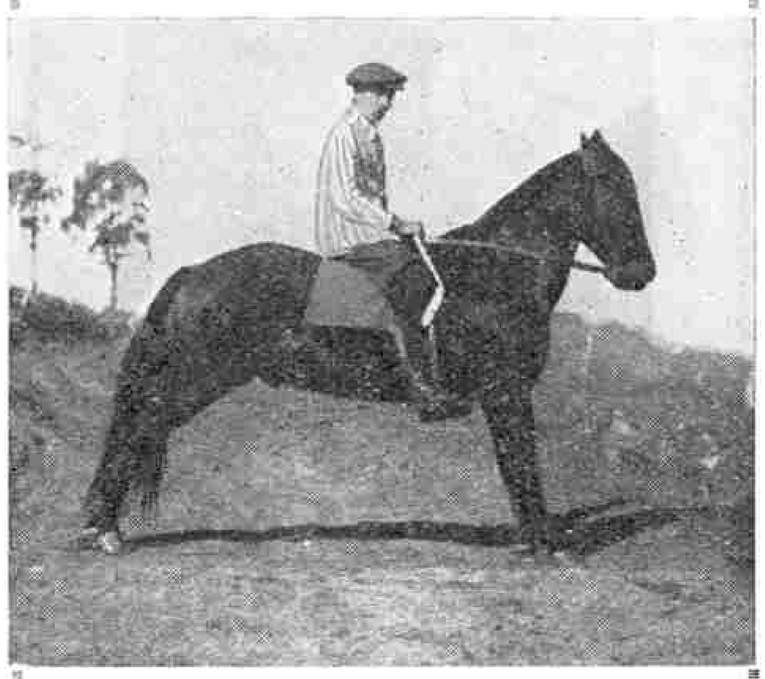
Having disposed of any undesirable features in the programme of the past session, the meeting should endeavour to devise one or more novel features for the coming session. The Leader should do his utmost to get every member present to put forward his ideas in this respect, and any proposals that appear to have a fair amount of support should be put into definite form, discussed, and afterwards voted upon. By this method of procedure a club's programme may be brought gradually nearer to the ideal that every item should be popular with every member.

The Ideal Programme

The Guild Correspondence Club has made steady progress from the time it was instituted, and as a result of its activities many hundreds of enduring friendships have sprung up all over the world. Mr. Hornby, the Guild President, takes a specially keen interest in this Club, and he is anxious that next year should see a great increase in the number of its members. The Guild Correspondence Club is the recognised means of communication between all Guild members who, through its agency, interchange thoughts and ideas upon all manner of interesting subjects and learn about each other's daily lives, hopes, and ambitions. There is no entrance fee, and all that a Guild member has to do in order to join the Club is to fill up an application form, a copy of which will be sent by return of post from Guild Headquarters. Correspondents are found in any country, and the letters may be written in English or in a foreign language as desired. Many members wish to have correspondents in far-off parts of the world. There is no difficulty in arranging this, but in such cases it is important that a member should realise the time that must elapse before he can receive a reply to his first letter. In the case of Australia or New Zealand, for instance, a reply cannot be expected under three months, and allowance should be made for this.

The Correspondence Club

From the Argentine



I have recently received the above photograph of Master José Atencio, who lives in the Argentine and is a Meccano enthusiast. José has sent also photographs of some excellent Meccano models he has built, including two of the Chassis fitted with the Torque Converter. These models display a good knowledge of engineering principles, and a special form of gearing he has invented and fitted to the Chassis shows remarkable cleverness. I am pleased to publish this photograph, and I know our readers will join me in congratulating this reader, who will often be in our thoughts although so far away.

It frequently happens that several members ask within a few days of one another to be accommodated with correspondents in one particular country, and occasionally this results in a little delay in finding suitable correspondents. This is particularly the case with regard to Australia, New Zealand and Canada. In order to draw the attention of boys in these countries to the fact that there are many Guild members in the British Isles anxious to communicate with them, I give below the initials of a few of those members, together with the name of the town or county in which they live and the subjects in which they are chiefly interested. I hope that members who live in Australia, New Zealand and Canada who have not already joined the Correspondence Club will now do so at once. To save time, boys in the three countries named may obtain correspondence club application forms from our local agents (whose addresses will be found on page 440) and can send these forms, filled in, to me along with their first letter to their correspondent, to whom I will send it. I intend to maintain this feature as a register of "correspondents wanted," and I hope that it will result in a great increase in the membership of the Guild Correspondence Club.

Correspondence Club Register

Boys requiring Canadian Correspondents

Initials.	Town or County.	Hobby.*
C.W.	Atherstone	S.C.
S.M.	Antrim, Ireland	W.
R.G.	Lancashire	S. & N.S.
G.S.	Middlesbrough	W.
A.H.	Lanarkshire	E.
A.H.	Sussex	S.C.

Boys requiring New Zealand Correspondents

J.S.	Sussex	N.S.
W.H.	Jersey	Football
C.B.	Bristol	E. & P.
E.Y.	Dorset	Model Yachts
S.K.	Hants.	Meccano

Boys requiring Australian Correspondents

W.W.	South Shields	Meccano
H.E.	Manchester	S.C.
C.M.	Leeds	N.S. & W.

* S.C.—Stamp Collecting. E.—Engineering.
W.—Wireless. P.—Photography.
N.S.—Nature Study.

In reading through the large numbers of application forms for membership of the Guild Correspondence Club, I often think what a pity it is that so few boys are able to correspond in any foreign language besides the French that they learn at school. This means that, in the ordinary way, an English boy who knows no Japanese and a Japanese boy who does not understand English are quite unable to communicate with one another, although both are able to build the same Meccano models. Fortunately, however, there is a way out of this difficulty to which I should like to call attention, and that is by the use of the international language, *Esperanto*. This language—first published in 1887—was compiled by Dr. Zamenhof, of Warsaw, Poland, and it is interesting to know that he had worked it all out when only 16 years of age. Since that time Esperanto has made very considerable progress and is in use by people of almost all nationalities as an auxiliary language by which they can communicate with one another. Several international congresses have been held year by year in different cities during each of which a full week's programme has been carried through entirely in Esperanto, without the slightest difficulty in understanding one another occurring among the many different nationalities represented. This international language is easy to learn

An International Code

(*Continued in col. 3 next page*)

How to Run a Meccano Club

by the

Guild Secretary

(*Concluded*)

Recruiting for the Guild

Enthusiastic members may do a great deal to help forward the Guild movement by recruiting new members. As a rule this is not at all a difficult matter, for once Meccano boys realise for what the Meccano Guild stands, they will join its ranks enthusiastically and without hesitation. It is a very remarkable fact that there are still many thousands of Meccano boys in this country who have never yet heard of either the Meccano Guild or the *Meccano Magazine!* This scarcely seems possible, so widely do we endeavour to make both known, yet the numerous inquiries I receive every day prove this to be the case.

In order to encourage members to spread far and wide the knowledge of the Guild, a Recruiting Campaign is organised every year. In connection with this campaign a Special Medallion is presented to each member who obtains three new recruits. When a member, having already gained this medallion, recruits six more members—that is nine altogether—he is entitled to have his name engraved upon his medallion together with the words "Special Award." For this purpose the medallion is returned to Headquarters.

The Special Recruiting Medallion is one of which any boy may well be proud. I am always glad to send full particulars of the Recruiting Campaign, together with application forms for new members, on request.

The Guild Badge

The badge of membership of the Meccano Guild is triangular in form and beautifully enamelled in colours. It is one of the conditions of membership of the Guild that the badge shall be worn on all possible occasions in order that members all over the country may recognise each other when they meet. The cost of this badge to each boy is 7d. The badge is sent post free in the United Kingdom, but on and after 1st January next members abroad will be required to pay 5d. extra for registered postage.

Before a badge is issued the prospective member gives his word of honour to conform with the rules of the Meccano Guild, which include the promise to promote the Guild's objects by example; to be helpful to others; to be clean in thought and habit, and to be determined to learn and to make progress.

The Club Leader's badge is similar in design to the member's badge, but is enamelled in different colours. Club Leaders should make a point of wearing the badge at all meetings of the club and on any other suitable occasions.

Conclusion

In this series of articles I have endeavoured to put forward suggestions and hints for forming and running a Meccano Club on successful lines, and also to provide information regarding the Meccano Guild in general. I hope that Club Leaders and Secretaries will have read these articles carefully, and that they will make an earnest attempt to put into practice as many as possible of my suggestions. At the same time I have had no desire to lay down hard-and-fast rules, because I know the important part that local conditions play in the running of a club, and that what may be excellent methods for one club may be utterly unsuitable for another. I do hope, however, that Club Leaders and Secretaries will at least consider seriously and, if possible, make a trial of any of my suggestions that are not already in practice in their own clubs.

However much space I had at my disposal it would be impossible for me to deal adequately with all the different local conditions that exist in the various towns and villages throughout the country. There are many difficulties in the way—some clubs have more than others—but it is the overcoming of these difficulties that counts. For the younger members of Meccano Clubs such work provides good practice for dealing with the more serious difficulties that arise in later years, the overcoming of which makes life worth while.

I earnestly hope that every Leader who has read my articles will apply himself whole-heartedly to the splendid task of helping boys to become good men. No better work than this can be desired or accomplished by any man.

Meccano Club Presidents

No. 2. Lt.-Gen. Sir John Keir, K.C.B.



Prominent men all over the country take an increasing interest in the good work accomplished by their local Meccano Clubs. The Leamington Club is particularly fortunate in this respect, for that distinguished soldier, Lt.-Gen. Sir John Keir, has for some years not only held the office of President but has taken a keen personal interest in the meetings of the club.

Sir John has seen active service in two wars, the South African War and the Great War, and a short account of his career must prove an inspiration to all British boys. Sir John was educated at Wimbledon College, and after passing through Woolwich he joined the Royal Artillery in 1876. His ability soon gained him rapid promotion, and by 1884 he had attained the rank of Captain, and in 1909 Major-General. During this period he served through the South African War and was mentioned in despatches and awarded the Queen's Medal with five clasps.

On the outbreak of war in 1914 he commanded the Sixth Division in Ireland, and in 1916 was appointed to the command of the Sixth Army Corps in France. After again being mentioned in despatches he was promoted to Lt-.Gen. in 1916 and was honoured by both France and Belgium, being awarded the Medaille Militaire and granted the Insignia de Grand Officier de L'Ordre de la Couronne (Belge). He also holds the much coveted R.A. gold medal for a prize essay. In addition to his high honour as Knight Commander of the Bath, Sir John also is a Justice of the Peace and Deputy-Lieutenant for Warwickshire.

Sir John has always been interested in boys and their work, and every one of the 40,000 members of the Guild will envy Leamington in having so distinguished a soldier as their Club President.

A New Booklet

I have received a very large number of requests from members of the Guild that I should reprint my articles on "*How to Run a Meccano Club*" in booklet form. I have decided to do this, and in preparing the booklet I am taking the opportunity of adding fresh matter that I believe will greatly increase the interest and value of the booklet. This new booklet, which will take the place of the two existing booklets, "*Suggestions for Club Secretaries*" and "*Notes for Club Leaders*," will be printed as soon as possible and will be forwarded on receipt of 2d. (postage) as soon as ready.

Secretary's Notes—(*cont. from previous page*)

and its grammar has one great advantage that will make a strong appeal to boys who are struggling with the complexities of Latin—it has no exceptions and no irregularities!

Yet another advantage about Esperanto is that matter written in it can be translated without previous study by means of a specially-published series of keys costing a penny each. These keys form a most fascinating sort of secret code by which an English boy can communicate with a boy speaking any other language in the world. All you have to do is to write your letter in Esperanto by the use of the English-Esperanto key and send your letter to your correspondent, enclosing a similar key printed in his own language. Your correspondent will then be able to decipher your letter and understand you without difficulty. I can strongly recommend this as an extremely interesting and amusing pastime. I give below a paragraph written in Esperanto and dealing with the Meccano Correspondence Club, and I am sure that very many of my readers will be interested in reading it through and perhaps getting some idea of what it is all about.

Keys to the Code

Mekana Koresponda Klubo

Ni deziras eltrovi kiom da Mekanaj Knaboj scias iom de la internacia lingvo:—Esperanto.

Mekanaj guildanoj apartenas al kunularo internaci kaj kelkaj el ili skribas leterojn inter si per la koresponda klubo; sed la lingva malfacilo malhelpas ke la plej multaj skribu al knaboj alilande, kaj ech tiu, kiu skribas ne ofte povas skribi pli ol unu fremdan lingvon.

Chu ne estus pli bone se chiu gildano posedanta la internacian spiriton lernus la internacian lingvon Esperanton, kaj tiel plivastigos sian kunularon.

Se vi konsentas kaj scias iom de la lingvo kaj shatus korespondi per ghi, mi petas ke vi skribu al la *Secretario de la gildo Mekana, Old Swan, Liverpool, Anglujo.* sendante vian nomon kaj poshtan adreson.



CLUB NOTES

Peterboro' M.C.—The first meeting of the session was held at the end of September, when the various club officers were elected by vote. A very interesting programme was drawn up, among the chief features of which were papers by members on "Wembley" and "Railways," and notes on "Experiences in France" by a member who has visited that country during the year. Other activities include Model-Building, Question Teams, Lectures and Tricks and Games. It is also proposed to hold a Social at Christmas. New members continue to join and it is hoped to make the club a greater success than ever this session. Club roll: 31. *Secretary*: Master A. Marsh, 88, Granville St., Peterboro'.

St. Mary's (Newington Butts) M.C.—Among the many activities of this club have been practical demonstrations of railway layouts constructed by members, which created marked enthusiasm. An enjoyable and instructive lantern lecture on "London 'Buses" was given, and further lectures have been arranged. Certain evenings have been set apart for Model-Building and Dock Construction. The Fretwork Section is run concurrently and it is always well supported. Club roll: 103. *Secretary*: Mr. C. Curle, 37, Pullen's Buildings, Peacock St., London, S.E.11.

The Meads (Eastbourne) M.C.—Members began their winter activities on 4th October and were able to put forward a most interesting programme for the winter, including a Concert to be given by the members, assisted by the local Girl Guides. Football matches have been arranged with local clubs and schools. Other items proposed were Lectures, Model-Making, Wireless Instruction and Woodwork. Club roll: 18. *Secretary*: Master F. Laycock, 10, Victoria Place, Eastbourne.

St. Mark's (London, S.E.) M.C.—An interesting visit was recently paid by all members to the British Broadcasting Company's premises in London. The first meeting of the session was held at the end of September, when a very attractive programme was drawn up. It was decided to hold an Exhibition at the local sale of work at the end of November, and a report of this will appear later. Club roll: 14. *Secretary*: Master G. C. Green, 21, Hafton Road, Catford, London, S.E.6.

King Edward (Birmingham) M.C.—Several new members were present at the re-opening meeting of the session on 14th October. The club have been fortunate in obtaining the services of local schoolmasters to give lectures on different subjects. It is intended to start a Club Magazine, and one of the members has undertaken to design all covers, posters, etc. Other activities include papers by members, debates and a Mock Trial, at which it is hoped relations and friends will be present. Club roll: 20. *Secretary*: Master N. J. Robertson, 30, Hinstock Road, Handsworth Wood, Birmingham.

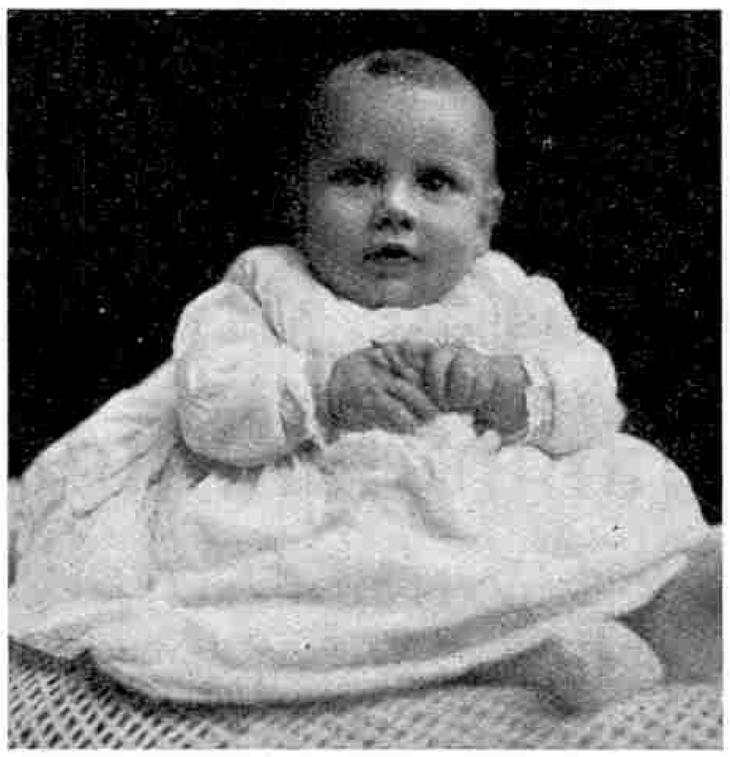
Sparkbrook (Birmingham) M.C.—A number of papers are to be read by club members, the subjects including Electrical Experiments, Chemistry and Printing. Other items in the programme are Model-Building, Games, Debates and Magic Lantern evenings. Meetings are held every Thursday. Club roll: 14. *Secretary*: Master F. Hubball, 71, Turner Street, Sparkbrook, Birmingham.

St. Mary (Bourne) M.C.—Has just recently become affiliated with the Guild and promises to be a very successful club. The first winter meeting was held in October, when it was arranged to run a football team. Meetings are held every fortnight. Club roll: 12. *Secretary*: Master Douglas L. White, Rosedale, Stoke, Andover.

Ruislip Common M.C.—Meetings are held every Tuesday under the Leadership of Pastor Grosvenor, who takes a keen interest in everything connected with Meccano. The club was affiliated in October last, and its motto is "Keen and Clean." A very interesting winter programme is being carried out, and every meeting is well attended. Club roll: 19. *Secretary*: Master L. Ive, Ruislip Common, Middlesex.

Bearwood M.C.—Commenced activities for the winter session in October. A very enjoyable programme was drawn up, one of the novel features being a Visitors' Night, when Meccano models made by members are to be exhibited. Other items include Lantern Lectures and Essays on various subjects, and it is also proposed to have an entertainment at Christmas. The club is now affiliated with the Guild. Club roll: 48. *Secretary*: Master C. White, 72, Katherine Road, Bearwood, Birmingham.

Our Youngest Guild Member!



Our photograph shows Master George Cardon, who is the youngest recruit to the Meccano Guild. When only four months old Baby George decided that Meccano was far better than golliwogs or rattles, and nearly swallowed a packet of his brother's nuts and bolts in trying to express his appreciation of the hobby!

Fortunately for George, his sister and brothers are all enthusiastic Guild members, and after a family consultation—during which George fell asleep—the following letter was sent to Headquarters:—

"Mother says that we can join up Baby George, so if you do not think him too young we are sending stamps for his badge. His photograph, taken when four months' old, is also enclosed, so that you can see what a fine boy he is."

We quite agree that our youngest Guild member is a very fine boy indeed, and he has certainly shown admirable taste in his choice of the Meccano hobby. We hope he won't swallow his badge for, with its three corners, it would be even more indigestible than a nut and bolt!



The Exhibit of the Herne Bay M.C. at the local Carnival

Rosyth M.C.—The club continues to make excellent progress and new recruits keep coming in. The club recently became affiliated with the Guild, at which all members were highly delighted. *Secretary*: Master Edward Hunter, 79, Admiralty Road, Rosyth, N.B.

South Park M.C.—Meetings are held every Tuedsay from 4 to 5 p.m. at the Boys' School. The club was granted affiliation with the Guild in October, and has quite a good membership. Club roll: 42. *Secretary*: Master Norman Tweddell, 103, Breamore Road, Seven Kings, Ilford.

Cheltenham Grammar School M.C.—This club, which has recently been affiliated with the Guild, shows great promise. The Masters at this school are taking a great interest in the welfare of the club, the Headmaster being the President and other Masters filling the posts of Leader and Treasurer. Club roll: 12. *Secretary*: Master E. W. Griffiths, Cheltenham Grammar School, Cheltenham.

Loanhead (Edinburgh) M.C.—It is proposed to hold an Exhibition early in the New Year and members are very busy preparing for this, hoping that a record crowd will be present. Another feature in the winter syllabus is a Lecture on the "Names and Uses of Meccano Parts." The Secretary is a very keen worker and has recently recruited several new members. Club roll: 17. *Secretary*: Master B. Warnock, R. P. Manse, Loanhead, Edinburgh.

Australia

Glenelg (South Australia) M.C.—This club is still making excellent progress, the average attendance on club nights being 22 members. A local gentleman, Mr. Moody, takes a keen interest in the work of the members and offers prizes for the best working models made. In a recent competition a chaff-cutter won the first prize, a windmill the second and a saw-bench the third. Another event of interest was a visit to the Australian Glass Manufacturing Company's Works, Kilkenny, in October, which all the members thoroughly enjoyed. Club roll: 63. *Secretary*: Master K. Holmesby, 22, Partridge Street, Glenelg, South Australia.

South Africa

Simonstown Meccano and Wireless Club.—Since its inauguration in April 1923, this club has made rapid strides. Meetings are held at the residence of the President, Mr. W. J. Creasey. A five-valve wireless set has just been constructed specially for the club by two local gentlemen. The club roll consists of 22, including one girl, the first and only girl to become a member of a Meccano Club in South Africa. *Leader:* Mr. R. G. Randall, c/o Municipal Office, Simonstown, South Africa.

Clubs not yet Affiliated

St. Annes-on-Sea.—Will shortly be affiliated with the Guild, as good progress continues to be made. A suitable club-room has been kindly lent, free of all charge, by a local gentleman, Mr. Challinor, who it is hoped will become President. Meetings are now held regularly, and an excellent programme has been arranged for the session, including a lecture on "Elementary Wireless" by a local expert. The present membership is 8, which will be considerably increased very shortly. *Secretary*: Master E. King, 109, Church Road, St. Annes-on-Sea, Lancashire.

Droylesden (Manchester) M.C.—Has now succeeded in obtaining an adult Club Leader, Mr. T. Hemmings, Scoutmaster, and also a suitable club-room. Application for affiliation with the Guild will be made shortly and there is every indication of this club being highly successful. Club roll: 8. *Secretary*: Master Frank Shorrock, 23, West Drive, Droylesden, Manchester.

Harwich M.C.—Has been successful in finding a very keen and capable Leader in Mr. Hogg, and a club-room has been kindly lent by the Vicar, who is very interested in Meccano boys. Very enjoyable and interesting meetings have been held at which various models were shown and explained, one model being a vertical steam engine in motion. Lectures have also been given on various types of cranes and their working, transporters, submarine weapons, etc. Great preparations are now being made for an Exhibition which it is proposed to hold just before Christmas. Club roll: 12. *Secretary*: Mr. E. Ward, Osborne House, Pepys Street, Harwich.

Proposed Clubs

Mansfield M.C.—Master Frank Johnson, of 11, Shirburn Avenue, Mansfield, is endeavouring to form a club and would be pleased to hear from any Meccano boy who would like to join. An adult Leader and a club-room are also needed.

Bray (Ireland) M.C.—Great efforts are being made to establish a Meccano Club in Bray and several boys have come forward to join. All Meccano boys interested are asked to write to Master G. Gallopher, Hope Villa, Novara Road, Bray.

The South Yardley (Birmingham) M.C.—All Meccano boys in South Yardley and district interested in forming a club are asked to communicate with Master Horace Young, 1238, Coventry Road, South Yardley, Birmingham. It is proposed to hold club meetings on Wednesdays.

HORNBY TR

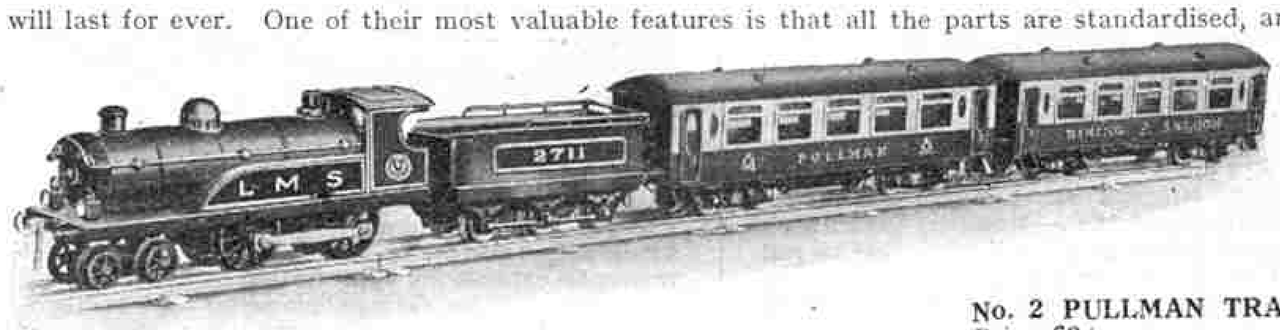
11-18th D

THE TRAINS WITH THE GUARANTEE

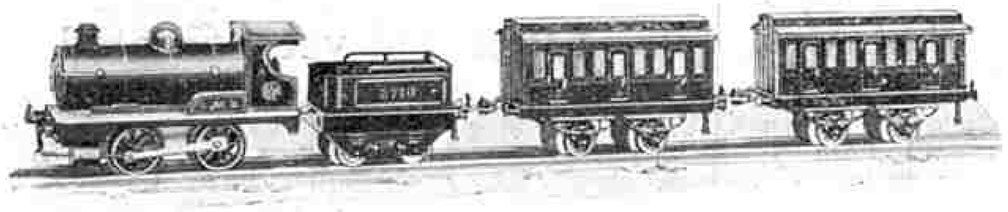
Hornby Trains are beautifully finished, strongly made, and will last for ever. One of their most valuable features is that all the parts are standardised, and any lost or damaged item may be replaced with a new one.
Every train is guaranteed, and you are therefore sure of satisfaction if you buy a Hornby.

No. 2 PULLMAN SET

The No. 2 Loco with Tender measures 17 in. in length. The Loco is fitted with superior mechanism, reversing gear, brake and governor, and the accurately-cut gears ensure smooth running. Loco, Tender and Coaches are superb in appearance and finish, enamelled in colours to represent the L.M.S. or L.N.E.R Companies' rolling stock, and stoved at a high temperature to ensure durability. Each set contains Loco, Tender and two Coaches, with set of rails to form a circle of 4 ft. diameter.



No. 2 PULLMAN TRAIN
Price **60/–**



No. 1 PASSENGER TRAIN

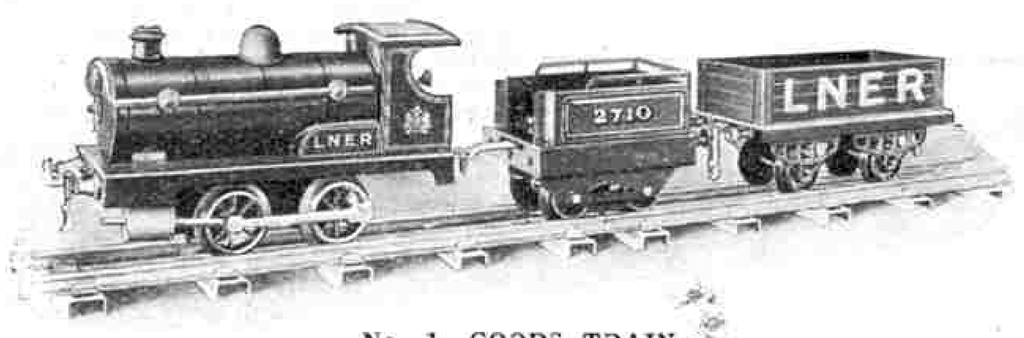
No. 1 PASSENGER SET

The Loco is fitted with reversing gear, brake and governor. Loco, Tender and Coaches are superb in appearance, beautifully finished in colour, and the doors of the coaches open. Each set contains Loco, Tender, two Passenger Coaches and set of rails. Price **30/–**

No. 1 GOODS SET

This set contains Loco (fitted with reversing gear, brake and governor), Tender, one Wagon, and set of rails consisting of curves to form a circle of 2 ft. diameter and two straights. Beautifully finished in colours to represent L.M.S. or L.N.E.R. rolling stock. Price **22/6**

No. 1 Hornby Loco	Price	**15/–**
No. 2 ,, ,, ...	,,	**22/6**
Hornby Passenger Coach	,,	**5/–**
,, Pullman or Dining Car	,,	**15/–**
,, Wagon No. 1	,,	**2/6**
,, ,, ,, 2	,,	**3/6**



No. 1 GOODS TRAIN

HORNBY TRA

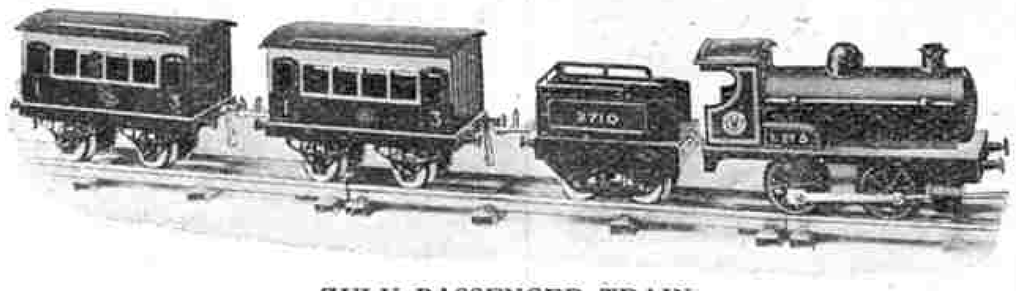
11-18th De

We have arranged for
miniature Railway Systems,
Trains and Rolling-Stock
Tunnels, Signals, etc., to
the country during this event
make every endeavour to
may give you many fresh
opportunity to inspect the ma
in the Hornby System.

ZULU CLOCK WORK TRAINS

Fully Guaranteed.

Fine and durable mechanism, and strength of construction in all parts are the main characteristics of this new type of clockwork train. The Zulu Loco is well designed and efficient, and will give long and excellent service. Richly enamelled and highly finished; fitted with brake and governor; non-reversing.

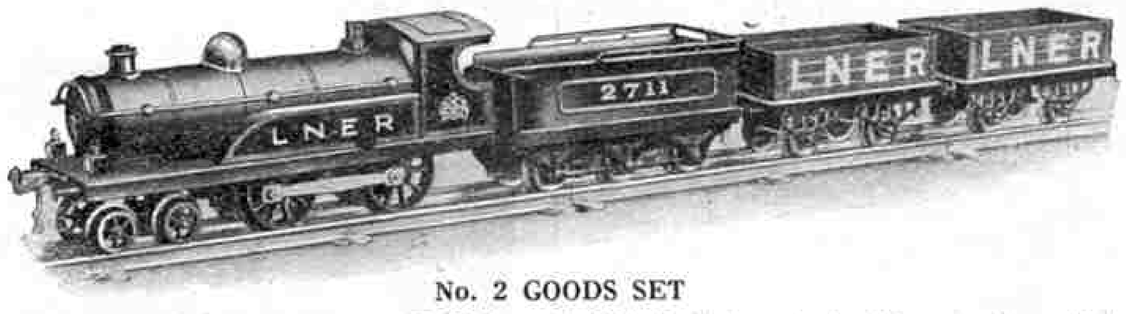


ZULU PASSENGER TRAIN

The Zulu Passenger Set contains Loco, Tender, two Passenger Coaches and set of rails, consisting of two straights and curves to form a circle of 2 ft. diameter. Well finished, in colours to represent the L.M.S. or L.N.E.R. Companies' rolling stock.

ZULU PRICES.

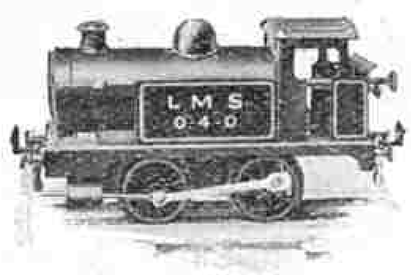
Zulu Passenger set, complete, packed in strong cardboard box	Price	**22/6**	
Zulu Goods set, complete, packed in strong cardboard box ...	Price	**17/6**	
Zulu Loco	**10/6**	Zulu Passenger Coach ...	**4/–**
Zulu Tender	**2/–**	Zulu Wagon	**2/6**



No. 2 GOODS SET

Gauge 0 in colours to represent L.M.S. or L.N.E.R. Companies' rolling stock. This set contains Loco, Tender and rails as in the No. 2 Pullman Set, and two Wagons. Loco fitted with reversing gear, brake and governor. Price **37/6**

HORNBY TANK LOCOS



No. 1 TANK LOCO

A strong and durable Loco capable of any amount of hard work; highly finished in colours; fitted with reversing gear, brake and governor.
Price **12/6**



No. 2 TANK LOCO

The Hornby No. 2 Tank Loco is a powerful model embodying all the characteristics of the Hornby Train. Beautifully finished in colours, and fitted with reversing gear, brake and governor. Price **30/–**

HORNBY CLOCKWORK TRAINS ARE OBTAINABLE FROM

RAIN WEEK

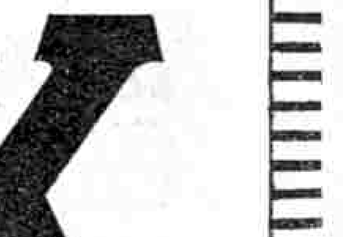
December

ROLLING STOCK AND TRAIN ACCESSORIES

(Hornby Series. Gauge O)

There are now 50 different train accessories—Stations, Signal-boxes, Lamps, Wagons, Level-Crossings, Foot-Bridges, Turntables, etc. Further accessories will be added to the system from time to time, and will be announced in the pages of the "*M.M.*"

All Hornby Rolling Stock and Accessories are built in correct proportion to the size, gauge, method of coupling, etc., of the Hornby Trains and all have the uniformly beautiful finish that is the great feature of the Hornby series. With these accessories you can build up a most realistic railway system, and the splendid range of rails, points, and crossings makes possible endless variety in rail layout. Hornby Trains are British made, and your dealer will be able to show you specimens of the new products.



SECCOTINE VAN
Price **4/–**

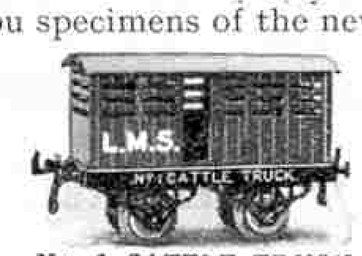
RAIN WEEK

December

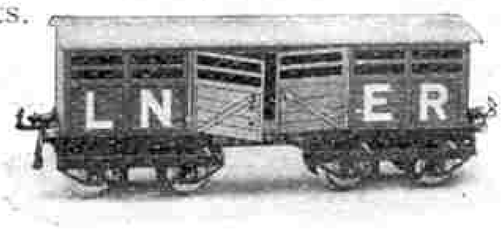
for displays of complete
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eventful week. You should
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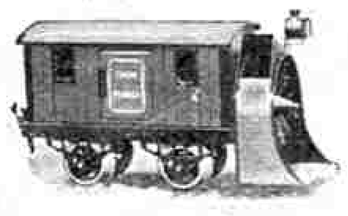
PETROL TANK WAGON
Finished in colour.
Price **3/–**



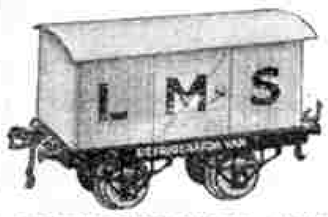
No. 1 CATTLE TRUCK
Fitted with sliding door.
Very realistic design.
Price **4/–**



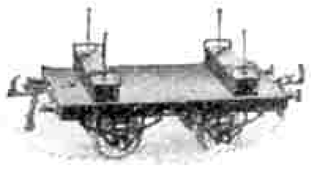
No. 2 CATTLE TRUCK
Splendid model fitted with double doors. Suitable for 2 ft. radius rails only. Price **6/6**



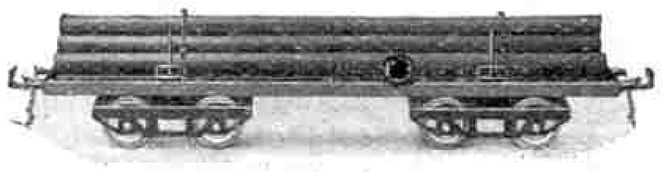
SNOW PLOUGH
Finished in grey, with revolving cutter driven from front axle.
Price **5/6**



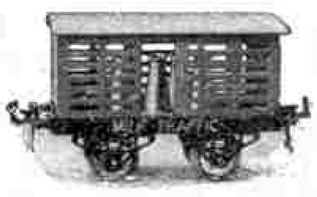
REFRIGERATOR VAN
Enamelled in white, lettered black. Price **4/–**



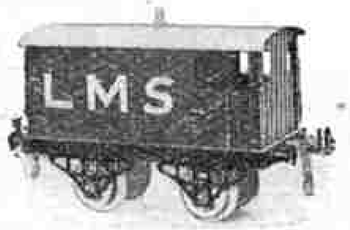
No. 1 LUMBER WAGON
Fitted with bolsters and stanchions for log transport.
Price **2/–**



No. 2 LUMBER WAGON
Fitted with bolsters and stanchions for log transport. Suitable for 2 ft. radius rails only. Price **5/–**



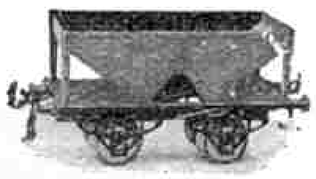
MILK TRAFFIC VAN
Fitted with sliding door, complete with milk cans. Price **4/6**



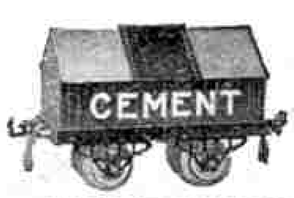
BRAKE VAN
Finished in grey, with opening doors. Price **4/–**



SIDE TIPPING WAGON
Excellent design and finish.
Price **3/6**



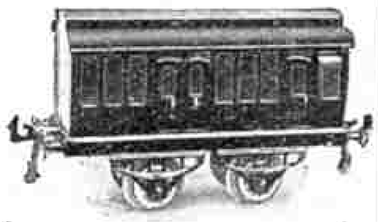
HOPPER WAGON
Mechanically unloaded.
Finished in colour. Price **4/–**



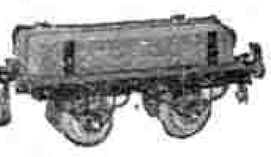
CEMENT WAGON
Finished in colour.
Price **4/–**



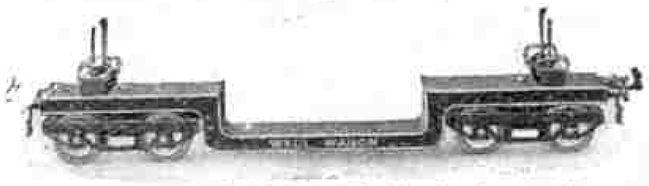
ROTARY TIPPING WAGON
Finished in colour.
Price **4/–**



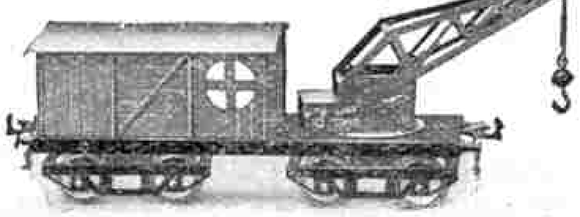
GUARD'S VAN
Price **5/–**



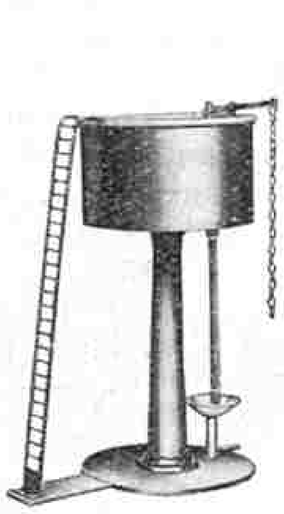
No. 1 TIMBER WAGON
Beautifully enamelled in green. Price **2/–**



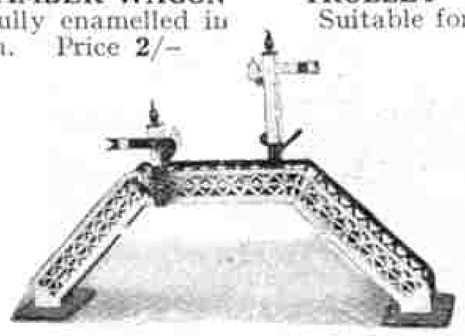
TROLLEY WAGON. Finished in colour. Suitable for 2 ft. radius rails only. Price **6/–**



BREAKDOWN VAN AND CRANE
Excellent finish. Beautifully coloured.
Suitable for 2 ft. radius rails only. Price **7/–**



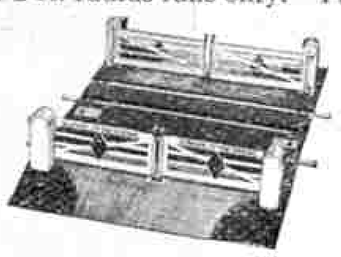
WATER TANK
Brightly coloured in red, yellow and black, 8½ in. in height, with flexible tube and pump lever.
Price **6/6**



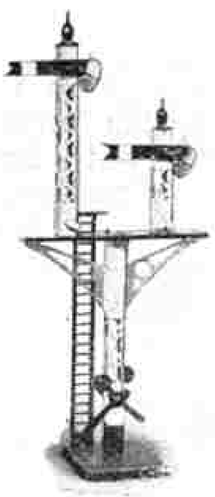
FOOT-BRIDGE
No. 1. With detachable signals.
Price **6/–**
No. 2. Without signals. Price **3/6**
Signals, per pair **2/9**



SIGNAL CABIN
Dimensions: height 6½ in., width 3½ in., length 6½ in. Finished in colour and lettered "Windsor." Roof and back open to allow signal-levers to be fitted inside cabin if desired. Price **6/6**



LEVEL CROSSING
Beautifully designed in colour. Measures 11¼ in. × 7¼ in., with Gauge 0 Rails in position.
Price **6/6**



JUNCTION SIGNAL
Signal arms operated by levers at base. Very realistic model standing 14 in. in height. Price **5/6**

OM ALL MECCANO DEALERS. ASK TO SEE SAMPLES



III. THE STORY OF SIGNALLING

Previous articles in this series have dealt with Laying-Out the Track, Points and Crossings, and Simple Layouts. In this article we give some interesting details of signalling in railway practice, on which the signalling of miniature systems is, of course, based. Next month our article will deal further with this side of the subject, with special reference to signalling arrangements on a miniature railway.

ONE of the most interesting features of modern railway working is the system of signalling, which ensures the safety of the millions of passengers who travel daily throughout the year.

The first train driven over the Stockton and Darlington line was preceded by a horseman carrying a flag. This arrangement worked quite well so long as the horse could travel faster than the train, but when the relative speeds became reversed the idea obviously would not work! Later, flagmen were stationed at various points on the line to regulate the traffic, and for some time the number of trains was so small that this method answered the purpose very well. Before long, however, the steady increase in the amount of traffic and in the speed of the trains made it vitally necessary to have a more efficient method of control, and on several lines a system of flag and lamp signalling was introduced. At certain points on the line a red flag by day or a red light at night was normally displayed, the red colour signifying danger and meaning "stop." A few minutes after a train had passed, the red flag or light was replaced by a green flag or light, the green signifying "go steadily," on some lines, and "right away" on others.

A Costly Joke

Red has always been recognised on railways as signifying danger. A story is told of a man who, while trespassing on the railway line, took it into his head that it was easier riding in a train than walking. He therefore tied his large red handkerchief to the end of his stick, waited until he saw a train approaching, and then vigorously waved his improvised flag. The driver of the train, taking it for granted that the man was trying to warn him of some danger ahead, promptly applied his brakes and brought his train to a standstill. The guard immediately enquired what was the matter, and the man calmly replied that he wanted a ride! He certainly got a ride in the luggage van, but at the next station the guard handed him over to the police, and shortly afterwards the local magistrates gave him a smart sentence to convince him that stopping a train for fun was apt to turn out a costly form of amusement!



Photo courtesy] [*L.N.E.R.*

Pullman Leaving King's Cross. First Stop Leeds

Early Semaphore Signals

Before long the flag and lamp were placed on a post about 5 ft. in height. Later, the height of the post was increased to 12 ft. and a disc was substituted for the flag. The first semaphore used in railway signalling was set up at New Cross in 1841, and from it have developed the signal posts and arms with which we are all so familiar.

The early semaphore signals had three positions. When the arm was horizontal, that is at right angles to the post, danger was indicated, as is the case with our present-day signals. "Caution" or "Proceed slowly" was signified by lowering the arm to an angle of

about 45 degrees, and for "all right" or "line clear" the arm was lowered until it was hanging down vertically and had practically disappeared inside a slot in the post. These three-position signals were abandoned after a time in favour of the two-position signals in use to-day. It is interesting to note, however, that the three-position signal in an improved form has been re-introduced during recent years, but it is not in general use.

An Ingenious Porter

For some time the semaphore signals were operated by men stationed at the foot of the posts, each man having one or two posts to attend to. The next step was to operate the signals by mechanical means from signal boxes. The story goes that a porter who had two posts under his care got tired of walking backward and forward between them, and set his wits to work to discover some method of saving himself this trouble. Finally he thought out a scheme of ropes and wires connecting the signal arms on the two posts, by means of which he could manipulate the signals from his hut without any walking at all. An inspector chanced to come round and see this ingenious arrangement and reported the scheme to the railway company, and instead of being reprimanded the porter found his idea generally adopted. There is a good deal of doubt as to the accuracy of this story, but at any rate it is certain that the signals came to be operated by wires from signal boxes.

Interlocking and its Advantages

Afterwards came another great improvement known as "interlocking," which consists of the combination of signal and points levers.

The object of interlocking is to prevent a signalman from accidentally setting points and signals in conflicting positions, which might lead to serious results. For instance, the interlocking mechanism prevents a signalman from lowering a signal to allow a train to approach until after he has set the points in the correct position for it to pass, and also it makes it impossible for him to have two signals at the same moment in such positions as can lead to a collision between two trains. Further, once a signalman has lowered a signal to allow a train to pass, he is prevented from moving any points connected with the line on which the train is travelling. Interlocking mechanism is very complicated, but in a future article we shall explain the principle on which it is operated.

Present-day Signals

The great railways of to-day are provided with a wonderfully complete system of safety devices, and travelling by rail—even at the highest speeds—is as free from danger as human ingenuity can make it. Signalling methods have reached a very remarkable degree of perfection, and trains are shepherded from their starting point to their destination with unceasing watchfulness.

Signal boxes are placed at various points all along the line, and from them the signals and points are operated by specially trained signalmen. The signals themselves are in the form of semaphore arms fixed on high posts by the side of the line. These signal posts are usually placed at the left-hand side of the line of rails to which they refer, and the signal arms are on the left-hand side of the posts as seen by the driver of an oncoming train. There are thus separate sets of signals for both "up" and "down" lines, "up" lines being lines leading towards a main terminus and "down" lines those coming from such a terminus.

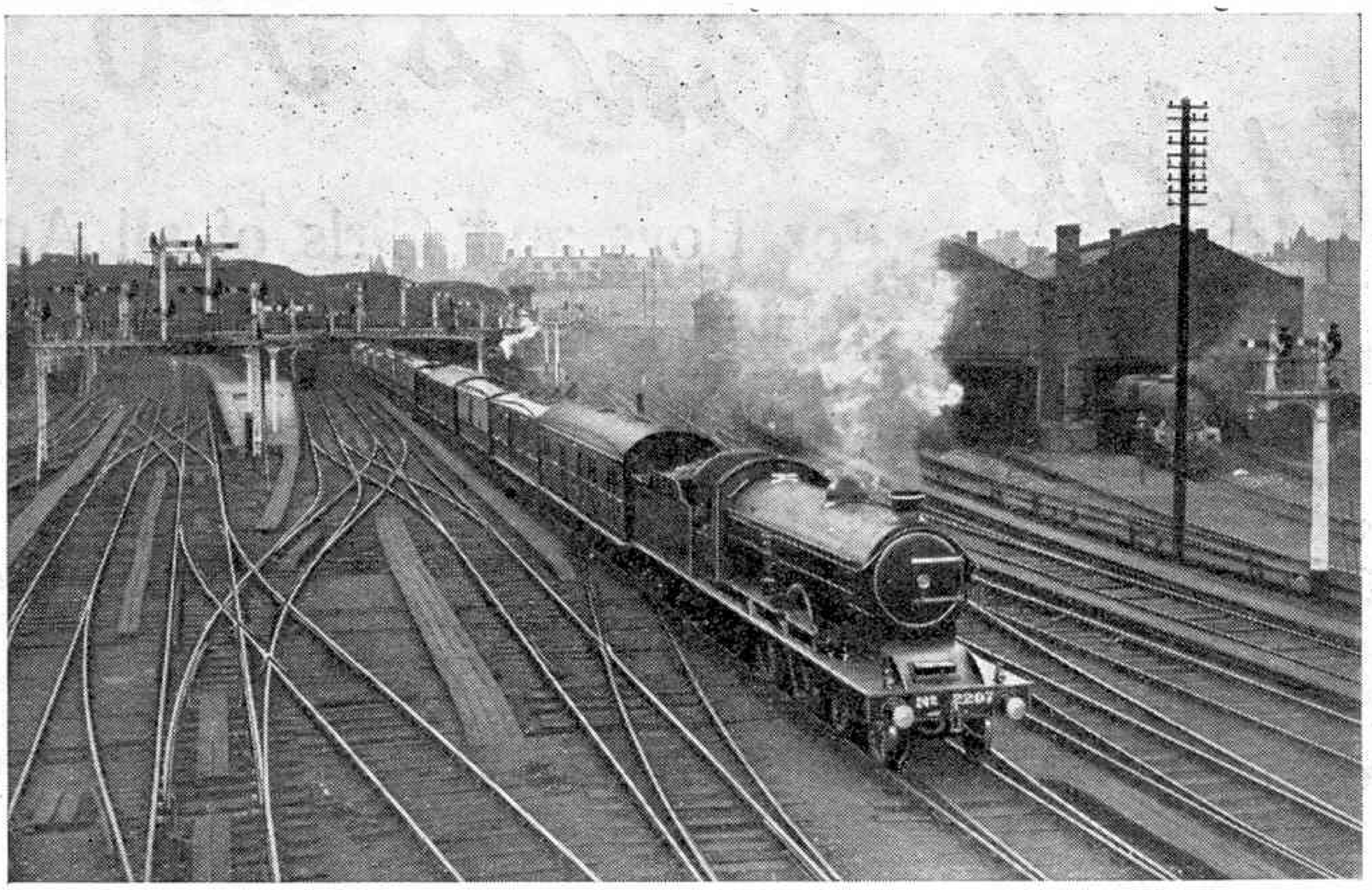


Photo courtesy] [*L.N.E.R.*

Scarborough to Liverpool via Leeds. 3.30 p.m. leaving York

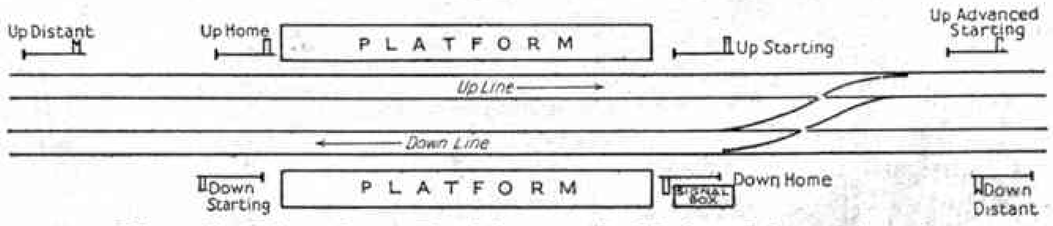


Fig. 1 Showing Position of Main Line Signals at a Small Station

Lights for Night Use

The front of the signal arms, that is the side seen by the engine driver, is painted red with a white stripe, and the back is painted white with a black stripe. Each signal post is also fitted with a lamp which is kept burning continuously and which requires replenishing with oil only about once a week. Coloured glasses, called "spectacles," are attached to the signal arms, and through these the engine driver views the light at night.

The normal position of a signal arm is horizontal, signifying "danger," and when the arm is in this position a red glass covers the light, also signifying danger. The "line clear" or "all right" indication is given by lowering the arm to an angle of about 60 degrees, and in this position a green glass is in front of the light. At one time a white light was used for this purpose, but its use proved to be dangerous. Drivers found it extremely difficult to decide whether a particular light was their signal or not, and there was always the possibility of a light in the window of a house close to the line being mistaken for a signal, with possibly disastrous consequences.

Signals are also provided with a small white light showing at the back. These "back-lights" are for the purpose of enabling the signalman to tell at night whether the lamps of his signals are burning and also whether the signal arms are working correctly in cases where the signals are in such positions that he cannot see the red and green lights.

A Safety Device

As we have already seen, the normal position of a signal arm is at danger, and the arm is held in this position by a weighted lever placed close to the foot of the post. Connection between the lever and the arm is made by means of an iron rod. Before the arm can be lowered the weighted end of the lever must be raised, and this is done by the movement of a lever in the signal box, which pulls a wire connected to a chain attached to the weighted lever at the opposite end to the weight. If the chain or the wire should break while the signal is in the "all right" position the weight on the lever will automatically raise the arm, and thus prevent the possibility of the signal still showing "all right" if the signalman does not immediately notice the breakage.

Signal arms are made either with square ends or "fish-tailed" ends. The square-ended arm is a stop signal and the fish-tailed arm is a "distant," or cautionary signal.

Why "Distant" Signals are Used

The first signal seen by the driver of a train approaching a signal-box is the fish-tailed "distant" signal, so called because it is the signal at the furthest distance from the box. The object of the "distant" signal is to warn the driver when the next or "home" signal is likely to be at danger, and so give him time to reduce the speed of his train ready to stop at the "home" signal if necessary.

(*Continued on page* 415)

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A Novel Electric Motor

Easily Made with Meccano

Many readers will be interested in the following account showing how an interesting working model of an electric motor may be constructed from standard Meccano parts.

THIS motor is designed on quite unorthodox lines, but it is none the less interesting on that account. The armature in particular, which also does duty as the commutator, is distinctly novel. Although this motor has run at a speed of 600 revolutions per minute under test, it should be mentioned that it has very little power and is not capable of doing any useful work. Its interest lies in the fact that it demonstrates the principles on which more powerful motors are constructed. In passing, it may be mentioned that when running at 600 revolutions per minute the armature receives 9,600 pulls per minute, and the brush is making and breaking contact 4,800 times per minute, wonderful figures considering the small size and nature of the model.

Constructing the Motor

To construct the motor first build the frame as shown in the illustration. The switch arm (1) is a 3½″ Strip pivotally bolted to the base plate (2) by means of an ordinary Meccano Nut and Bolt. Two metal Washers are placed on this Bolt between the Strip (1) and the base plate (2). The switch slides over two Flat Brackets (3 and 4), of which (3) is bolted direct to the plate (2), one metal Washer being placed between it and the plate. Flat Bracket (4) is bolted to and insulated from the plate (2) by a 6 B.A. screw, a fibre bush being placed between it and the plate. These two Flat Brackets must not be allowed to touch each other, nor must the Flat Bracket (4) touch the plate (2). A 2″ Strip (5) is bolted over the switch arm (1), being separated from the plate (2) by two metal Washers on each bolt.

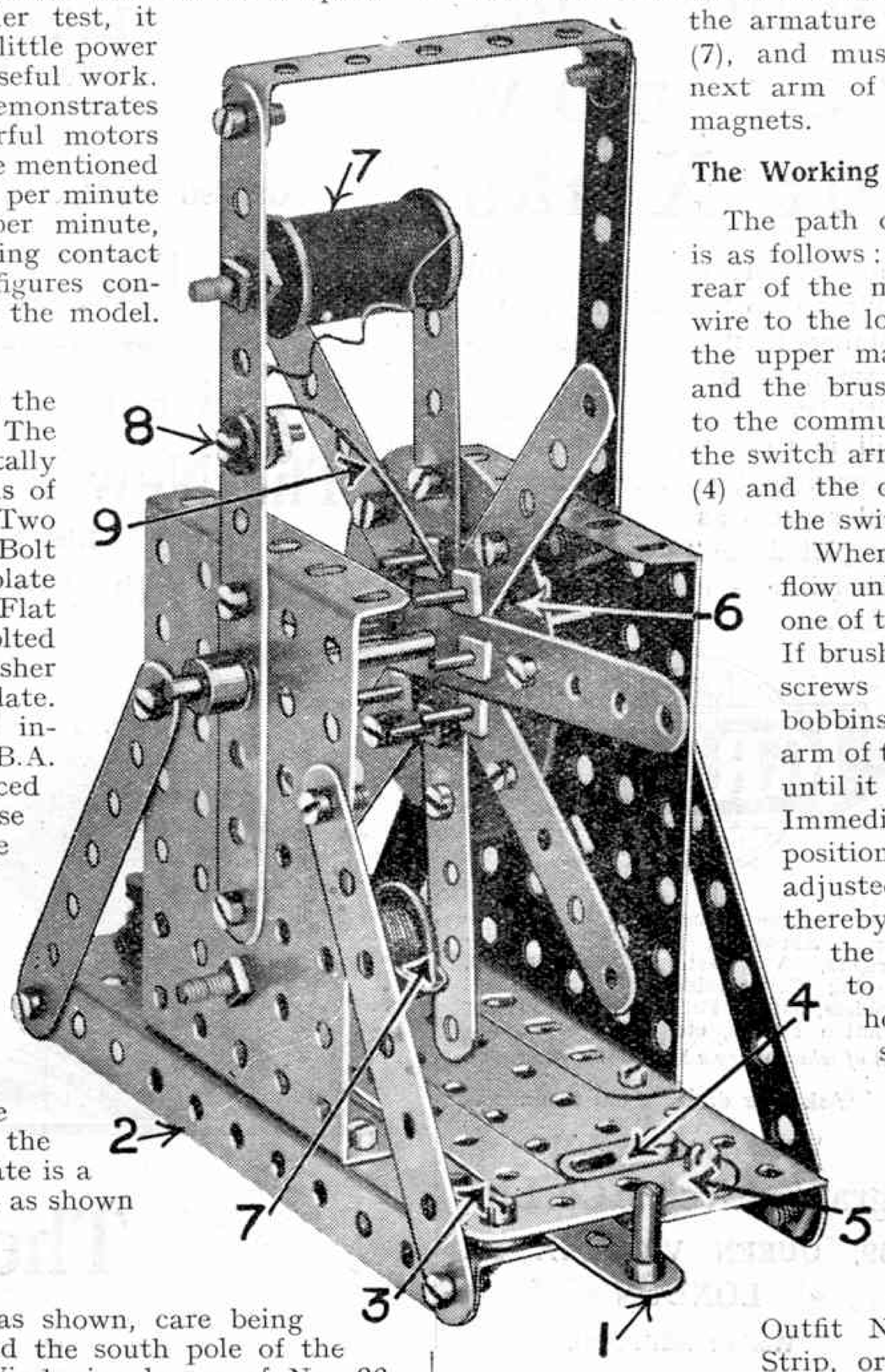
The combined armature and commutator (6) consists of a Face Plate and four 5½″ Strips. In each of the holes next to the boss of the Face Plate is a 6 B.A. screw, which is not insulated, as shown in Fig. 1.

How the Brush Makes Contact

The two magnets (7) are placed as shown, care being taken that the north pole of one and the south pole of the other are near the armature (6). Wind nine layers of No. 26 wire on each bobbin.

At the far end of the plate (2) are two terminals, both insulated from the plate. From one of them a wire goes to the 6 B.A. screw of the Flat Bracket (4) and from the other a wire goes to one of the wires from the lower magnet (7). Join the other wire from this magnet to one of the wires from the upper magnet. The other wire from the upper magnet is taken to the 6 B.A. screw (8), which is insulated from the main frame of the model in the usual way.

The brush (9) consists of 4″ bare copper wire. Bend this wire into a semi-circle and fasten one end to the 6 B.A. screw (8) so that there is electrical connection with the upper magnet (7) but not with the main frame. The free end of the wire (9) must brush against the commutator, which consists of the eight 6 B.A. screws on the Face Plate (6). The brush (9) must be adjusted so as to begin to touch one of the 6 B.A. screws of the commutator when two of the arms of the armature are equidistant from the magnets (7), and must break contact immediately the next arm of the armature comes opposite the magnets.



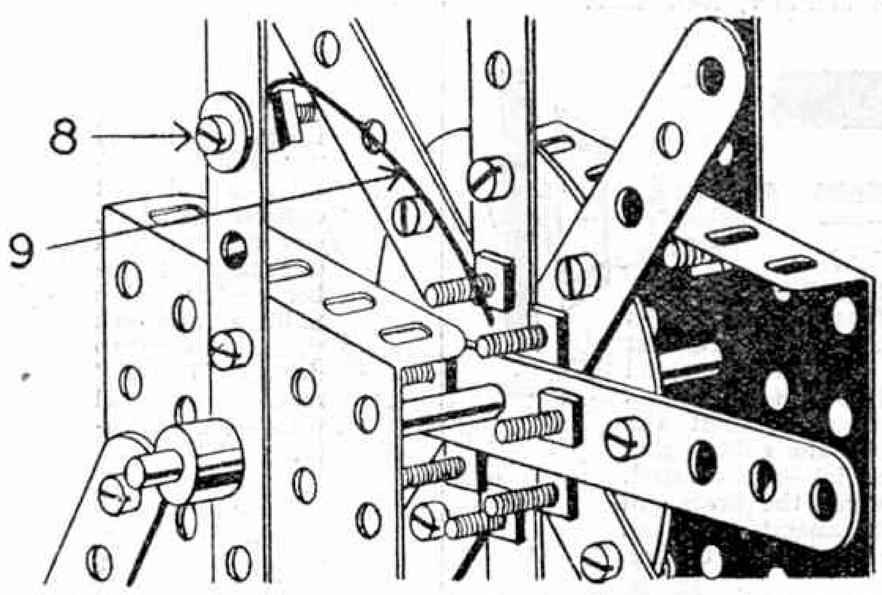


Fig. 1. Details of Commutator

The Working of the Motor

The path of the current through the motor is as follows: From one of the terminals at the rear of the model the current passes along the wire to the lower magnet (7), and from there to the upper magnet (7), the insulated screw (8) and the brush (9). From the brush it passes to the commutator, the frame of the model and the switch arm (1), and then to the Flat Bracket (4) and the other terminal. In our illustration the switch is shown in the "off" position.

When the switch is "on," no current will flow unless the brush (9) is in contact with one of the 6 B.A. screws of the commutator. If brush (9) is in contact with one of these screws current will flow, the cores of the bobbins (7) will be magnetised, and an arm of the armature (6) will be drawn round until it is opposite the poles of the magnets. Immediately the armature reaches this position, however, the brush, if correctly adjusted, breaks contact, the current is thereby automatically switched off, and the cores of the bobbin (7) cease to be magnetic and no longer hold the armature. Being thus set free, the armature will "free-wheel" round on account of the impetus already given to it, the brush will make contact with the next 6 B.A. screw and the cycle of operations will be completed.

The motor can be built with Outfit No. 5, or Outfit No. 4 and a 2″ Strip, or Outfit No. 3 and a 2″ Strip and a Face Plate, and the Electrical Outfit.

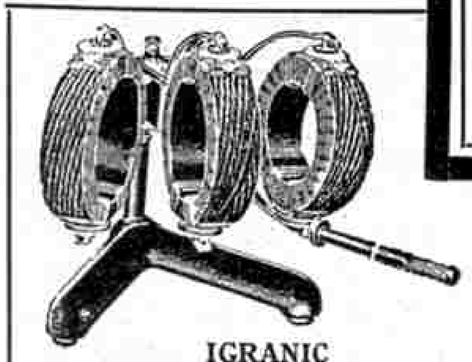
Parts required:

6	of No. 2	1	of No. 109
5	„ „ 3	1	„ „ 115
1	„ „ 6	2	„ „ 301
2	„ „ 10	5	„ „ 302
1	„ „ 16	3	„ „ 303
30	„ „ 37	12	„ „ 304
5	„ „ 37A	13	„ „ 305
9	„ „ 38	2	„ „ 306
1	„ „ 48A	2	„ „ 308
1	„ „ 52	30 yds.	„ 313
2	„ „ 53	10″	„ „ 314
2	„ „ 59	4″	„ „ 315

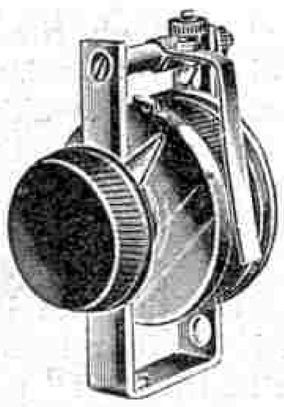
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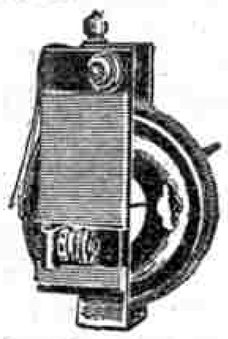




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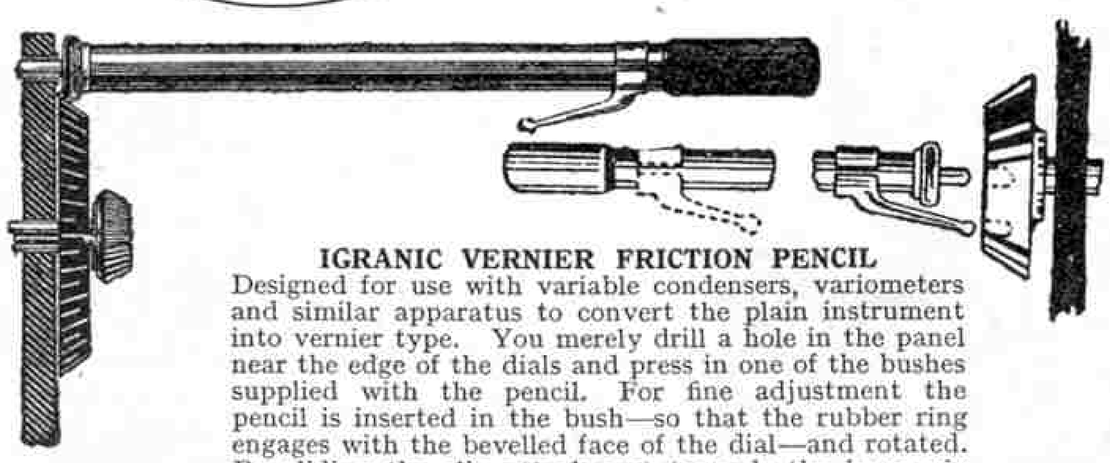
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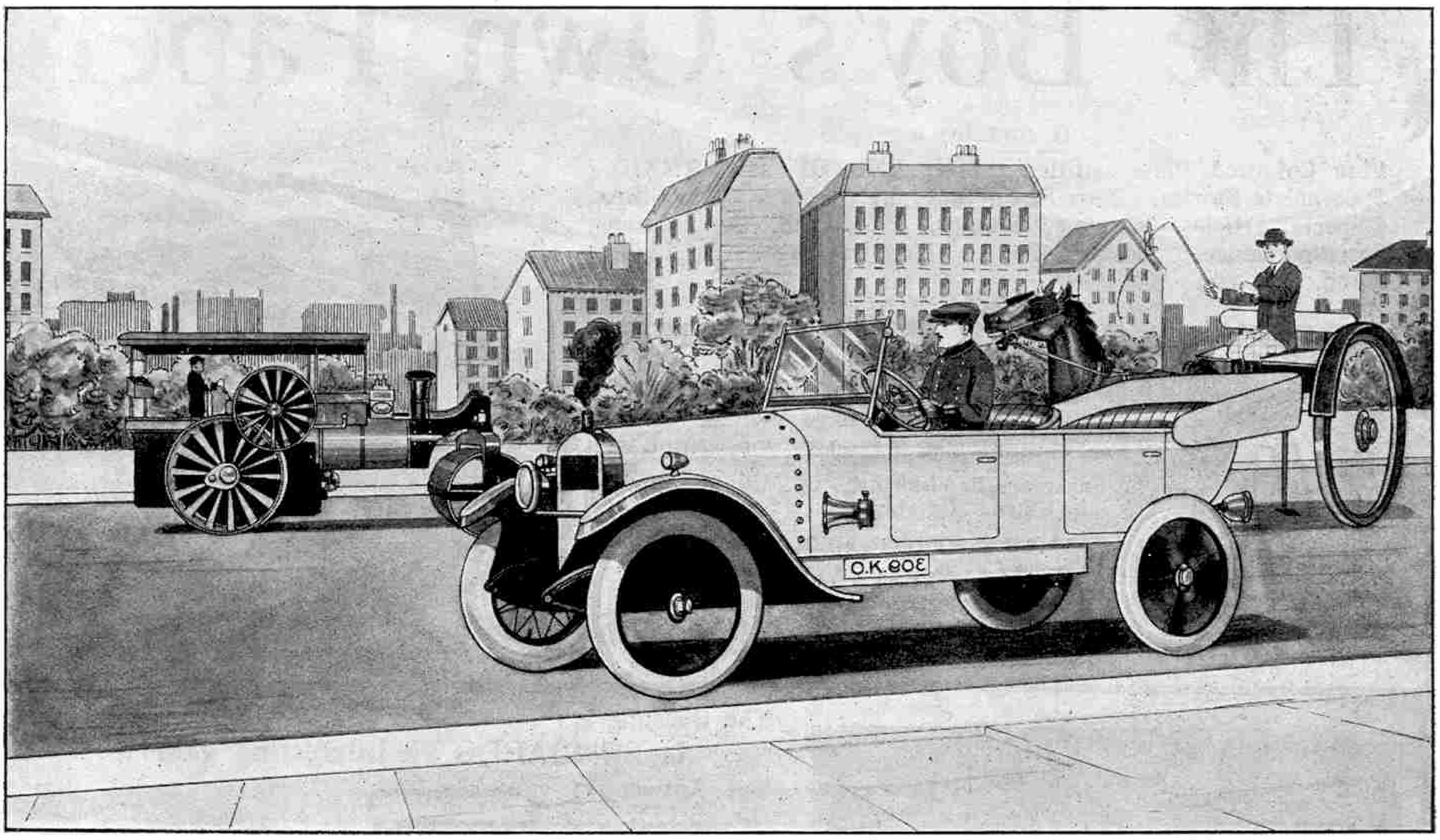
The Boy who built a Stage Coach

He was just an ordinary boy. Last week he bought a copy of **"TOBY,"** and inside he found a coloured cut-out model. With scissors and paste he set to work and soon erected a gorgeous model of a stage coach.

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Competition Corner



Have You Sharp Eyes: How Many Mistakes Can You See?

THIS drawing will test your powers of observation in this respect, for it has been made specially with this object in view. As you will see, all kinds of mistakes have been made in the drawing, and prizes are offered for those readers who discover the greatest number of errors. The first prize will go to the reader whose list contains the largest number of errors and the second and third prizes to those readers who send in the next best lists.

Some time ago we had a similar Competition and it created very considerable interest. So sharp are the eyes of Meccano boys that the winner of the Competition actually found 184 mistakes, although the artist had intentionally made only 39! There *may* not be as many mistakes in the above picture as in the former contest, but at the same time we assure our readers that there are quite a good number!

Competitors should therefore carefully examine the drawing and make a note of every mistake as they find it. Each mistake should be numbered, and as far as possible they should be grouped together. For instance, all the mistakes in connection with the motor car should be placed together on your list. Each mistake should be described in the smallest possible number of words and the total number of mistakes found should be given at the foot of your list.

Entries may be sent in at any time, but must reach this office before the 31st January next. Those from Overseas readers must reach us before the 30th April next.

Don't forget to put your name and address on each sheet of paper, as sometimes entries become separated, and unless each sheet has on it the name and address of the entrant, it is impossible for us to identify it.

Another New Contest

In view of the great interest shown by thousands of our readers in Postage Stamps, and as our last "Bargain Hunt" was a great success, we are arranging another competition on similar lines. As before, this will take the form of a "bargain hunt" through the announcements of stamp dealers in this month's issue.

Competitors should carefully study each separate announcement, and from their knowledge and experience of stamps decide which dealer's announcement offers the greatest value. When the best item has been decided upon, then a second and third must also be chosen. The three should then be written down in order of merit on a post-card, together with the name, address and age of the competitor. The entry must not carry any other correspondence.

The first prize in the contest will be a packet of stamps, value £1/1/–, or stamps to that value, to be chosen from any one firm advertising in the "*M.M.*" The prize will be awarded to the entry that most nearly corresponds with the general order of voting. There will also be three other prizes for the next three competitors in order of merit, and these prizes will entitle the winners to a free advertisement (value 5/– each) in which to announce their own bargains or wants in our advertisement columns.

(*Continued on page* 413)

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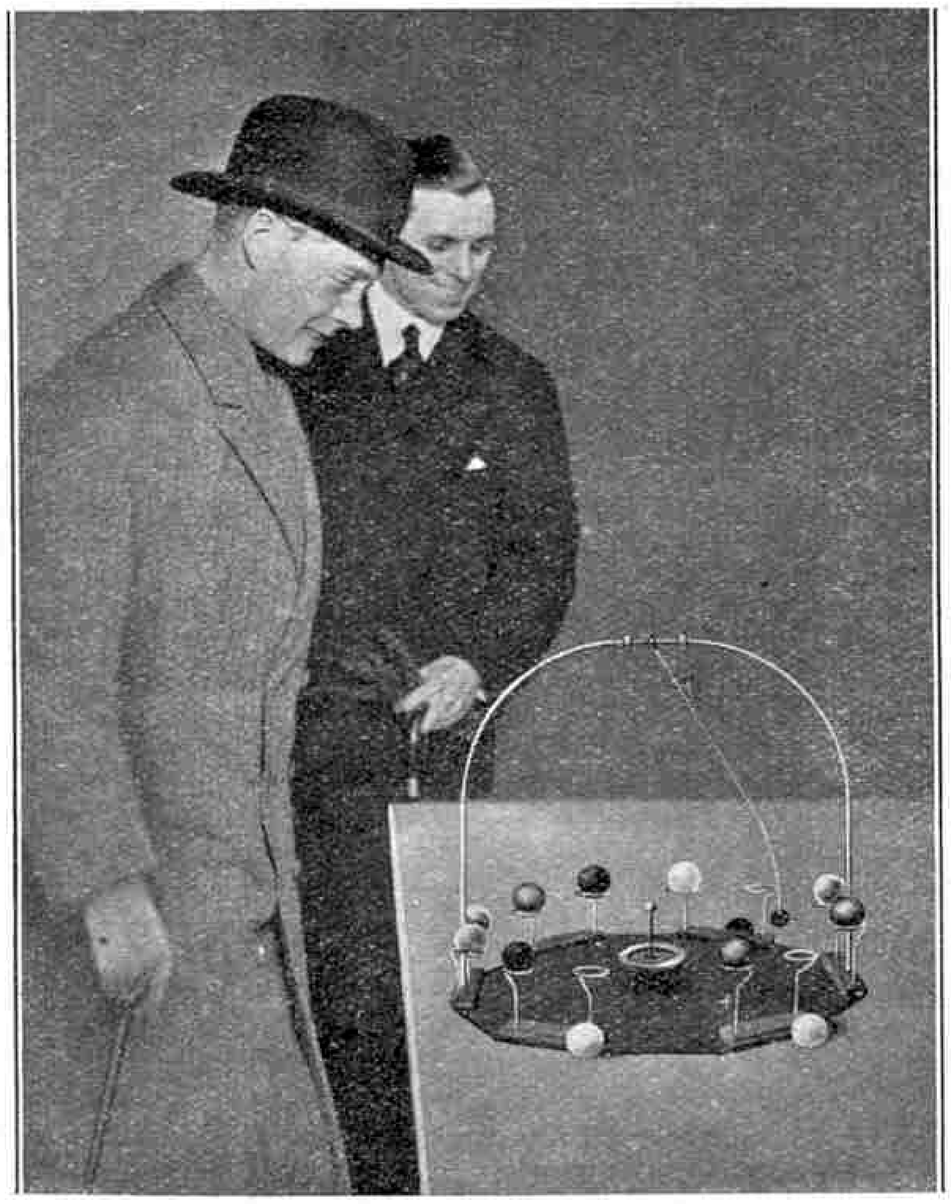
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Result of 10th Photo Contest

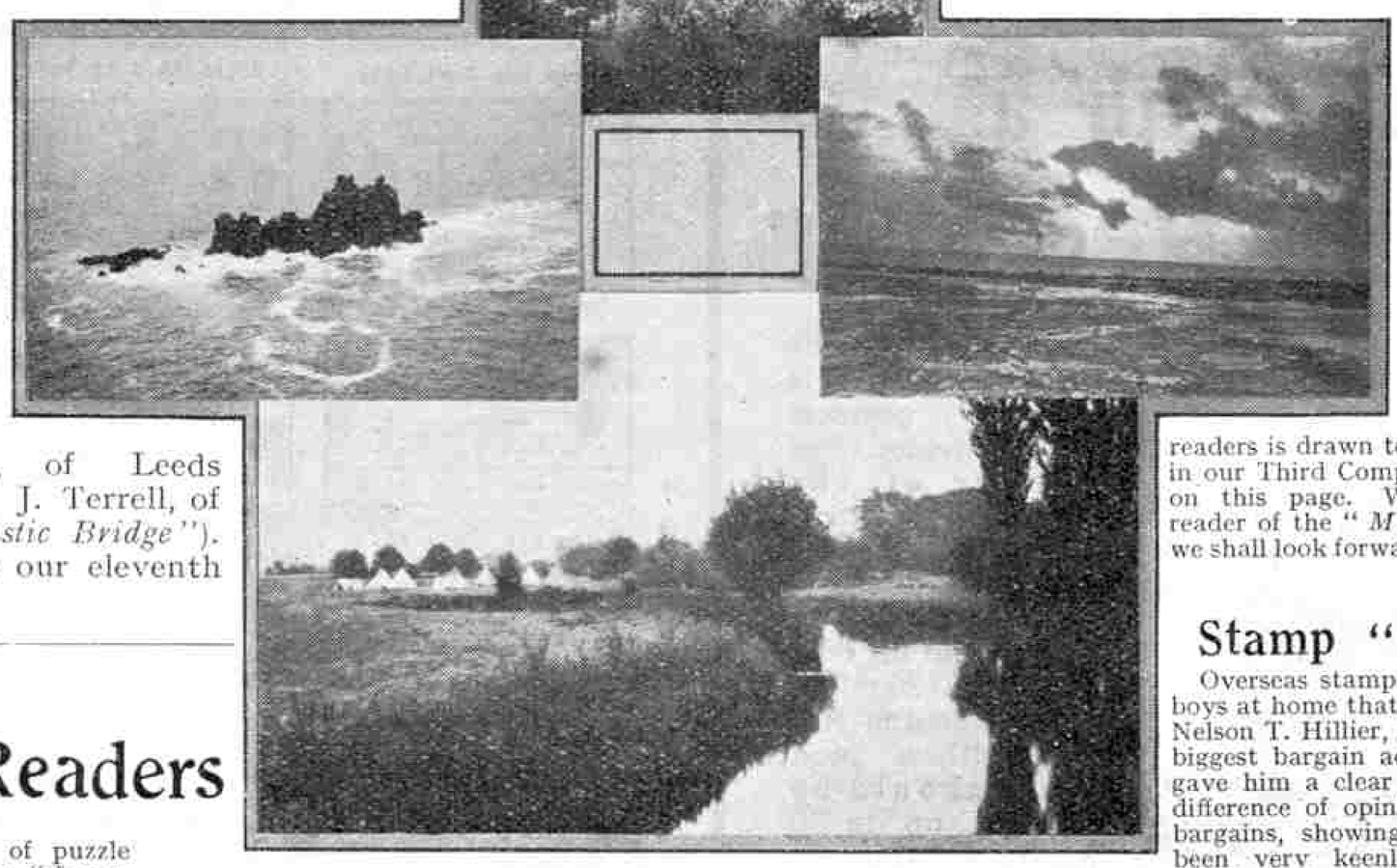
"A Beach or Riverside Holiday Scene"

Beach and riverside scenes are apparently popular subjects with Meccano photographers, for the response to our Tenth Photographic Competition was very satisfactory. The standard of the entries, too, was considerably higher than in previous contests, and some remarkably good studies of country scenes and seaside views were submitted. As will be seen from the accompanying illustration, the winners sent excellent prints, which were not only well finished but showed merit in their composition also. The prize-winners are to be congratulated on their skill and their success in a very close contest.

The competition was, as usual, divided into two sections, the first prizes being won by R. Robinson, of Cheltenham ("*Sunset over the Sea*") and T. D. Meredith, of Bath ("*Our Summer Camp*") respectively, whose entries are fine examples of amateur photography. Meccano No. 1 Radio Receivers have been despatched to these boys, while Meccano goods to the value of 5/- have been awarded to the second prize-winners in each section—Harold Scott, of Leeds ("*Breakers*") and Basil J. Terrell, of Par, Cornwall ("*The Rustic Bridge*").

We hope to announce our eleventh contest next month.





(Top) The Rustic Bridge.
(Left) Breakers. (Right) Sunset over the Sea.
(Bottom) Our Summer Camp.

FOR Lynx-Eyed Readers

We give here the final set of puzzle pictures in our third contest for "Lynx-Eyed" Readers. As in the two sets previously illustrated, each of these pictures represents a part of some model in the 0-3 Manual of Instructions (Editions No. 23 or 24).

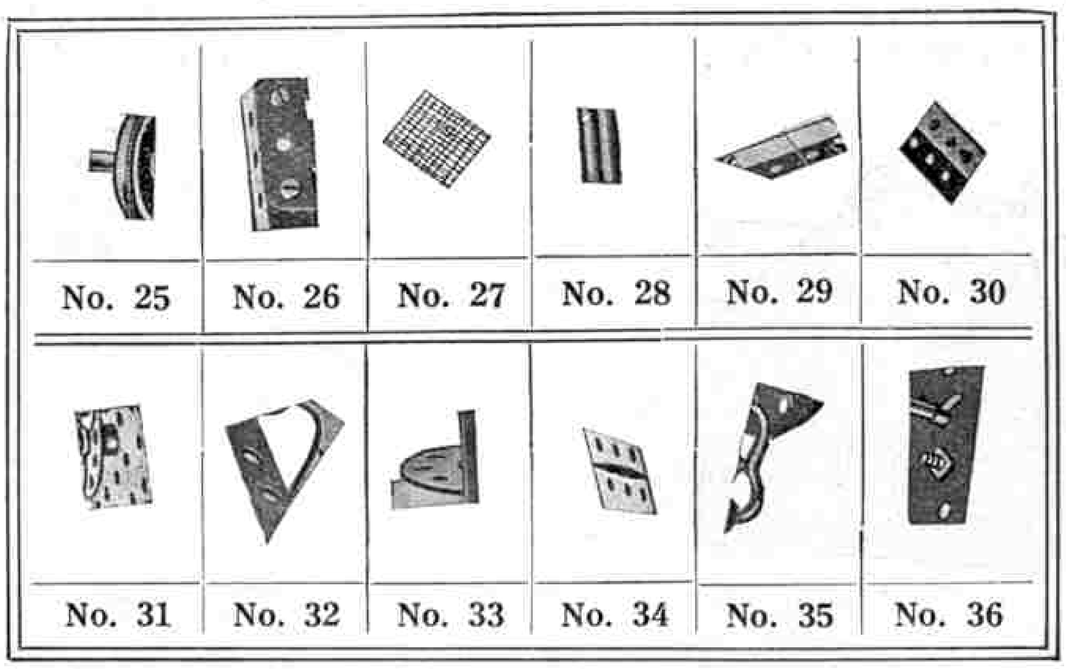
When the models to which these twelve parts belong have been identified, their numbers, together with those of the pictures illustrated in the last two issues, should be neatly copied on to a postcard. Each postcard must also bear the name, address and age of the entrant, but no other correspondence is to be written on the card. Typewritten postcards are not allowed, as those who submit them have an unfair advantage over boys who are not fortunate enough to possess a typewriter. Any entry not fulfilling these conditions will be disqualified.

This Third Competition is certainly the most difficult yet announced in the "*M.M.*," but Meccano boys do not like "easy" contests, for they pride themselves on the fact that they have sharper eyes than any other boys! Perseverance and patience are needed to solve these puzzles, and if you find that, after all your efforts, you are unable to solve the whole of the 36 pictures, send in your entry just the same, as other competitors also may have been unable to complete their sets.

There are 27 splendid prizes offered in this competition and the first will be awarded to the entrant who succeeds in correctly solving all the 36 puzzle pictures. The other prizes will be given to the next nearest competitors in order of merit. If no reader is able to solve all the puzzles correctly, the first prize will go to the entrant whose solution is most nearly correct. In the event of a tie, neatness of writing will be taken into consideration in awarding the prizes. The Editor's decision is final in all cases.

Entries may be sent in at once and should be addressed to "Puzzle Pictures," *Meccano Magazine*, Binns Road, Liverpool, and must reach this office before the closing date, which in the United Kingdom is 31st December (Overseas Readers 30th April). (*New readers may obtain copies of the October and November "M.M.," containing the first and second set of Puzzle Pictures, on application to the Editor. Price 3d. each, post free*).

First Prize:	Hornby No. 2 Pullman Set.
Second Prize:	Meccano No. 1 Radio Receiver.
Third Prize:	Pair Meccano Headphones.
Consolation Prizes:	12 Meccano Writing Pads; 12 Meccano New Complete Manuals (1924).



THIRD COMPETITION—FINAL SET.

For Overseas Readers

Result of Second "Lynx-Eyed" Contest

As in the case of the entrants in the United Kingdom section of this contest, Overseas readers found that the Second Lynx-Eyed Puzzle Pictures required considerable perseverance to solve them. We knew this would be the case when we arranged the pictures, and those competitors who succeeded in correctly numbering every model well deserve to be congratulated. Altogether seventeen correct entries were received, and in accordance with the rules the prizes have been awarded in order of merit, the competitor's age and neatness of writing being taken into consideration.

The first prize of a Hornby No. 2 Tank Loco has been awarded to H. V. Reynolds, of Georgetown, British Guiana. The second prize was a Meccano No. 1 Radio Receiver, but as the winner, John Byrne, of Toowcomba, Queensland, apparently lives outside the range of a crystal set, he is being aksed to select Meccano products to the value of his prize. Third prize, Meccano Double Headphones, went to M. Cavallinie, of Rome, Italy.

Consolation prizes of Meccano Complete Manuals or Writing Pads have also been awarded to the following competitors:—Akbarali Abdulrahim (Karachi); T. S. Bilimoria (Bombay); Flip Begemann (Java); Carel Begemann (Java); Singh Dudhoria (Bengal); V. R. Heeramaneck (Bombay); D. R. Heeramaneck (Bombay); J. R. Heeramaneck (Bombay); A. Johnston (Milan); A. F. Mody (Bombay); Henry Powell (Malta); James A. Saddler (Adelaide); H. Theissen (Groningen); Wm. T. Turnbull (Alberta, Canada).

The attention of our Overseas readers is drawn to the final set of Puzzle Pictures in our Third Competition for Lynx-Eyed Readers on this page. We hope that every Overseas reader of the "*M.M.*" will enter this contest and we shall look forward to a record number of entries.

Result of Stamp "Bargain Hunt"

Overseas stamp-collectors agreed with Meccano boys at home that the packet of stamps offered by Nelson T. Hillier, in the August "*M.M.*," was the biggest bargain advertised. The order of voting gave him a clear majority, but there was a big difference of opinion as to the second and third bargains, showing that each advertisement had been very keenly studied. According to the number of votes received the correct list is as follows:—(1) Hillier, Horsmonden, Kent; (2) Witherick, Coventry; (3) Lisburn & Townsend, Liverpool. No entry was received giving these names in their correct order and the prize has therefore been awarded to the competitor who succeeded in placing the first two correctly.

The winner is J. P. Colman, of Johannesburg, South Africa, who is entitled to a 10/6 packet of stamps to be chosen from any advertiser in the "*M.M.*" A free one-inch advertisement has also been awarded to the stamp dealer whose name heads the list of bargains.

A similar competition for stamp-collectors is announced on page 411 and Overseas readers will again have an opportunity of "sitting in judgment" on our advertisements.

Closing Dates for Competitions.

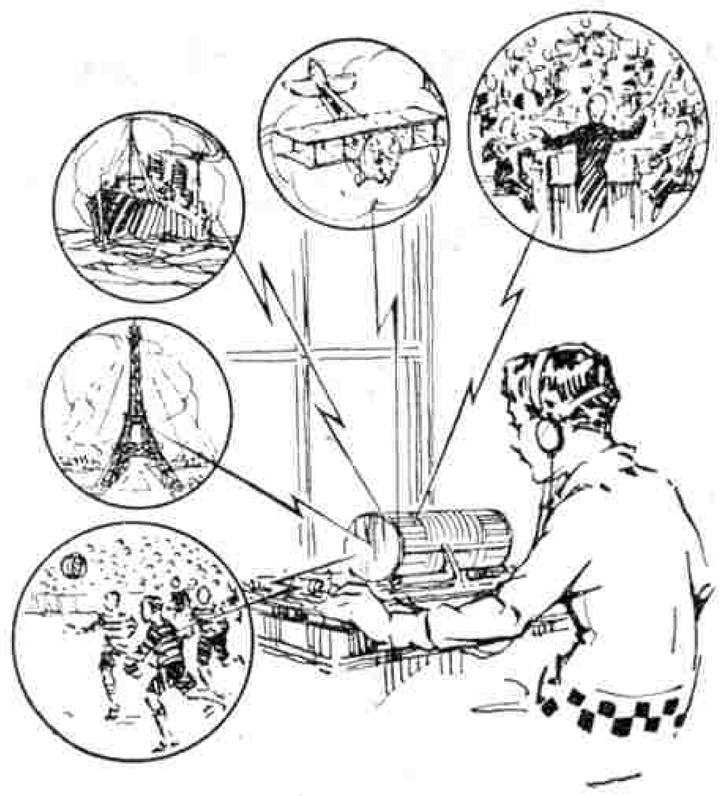
Planning a Hornby Railway: Overseas—28th February.
Third Lynx-Eyed Contest: Home—31st December. Overseas—30th April.
Tenth Photographic: Overseas—31st January.
Stamp Bargain Hunt: Home—31st December. Overseas—31st January.
Puzzle Picture Contest: Home—31st January. Overseas—30th April.

Another New Contest—(*continued from page* 411)

Two further consolation prizes have also been offered by Nelson T. Hillier, whose stamp advertisements are familiar to readers of the "*M.M.*" These will take the form of a collection of 1,000 different stamps to the best runner-up under 12, and a Standard Catalogue of Postage Stamps, 1925 Edition, to the best runner-up over 12 years of age.

The stamp dealer in whose advertisement the biggest bargain was found will have an advertisement, up to one inch space, inserted once free of charge.

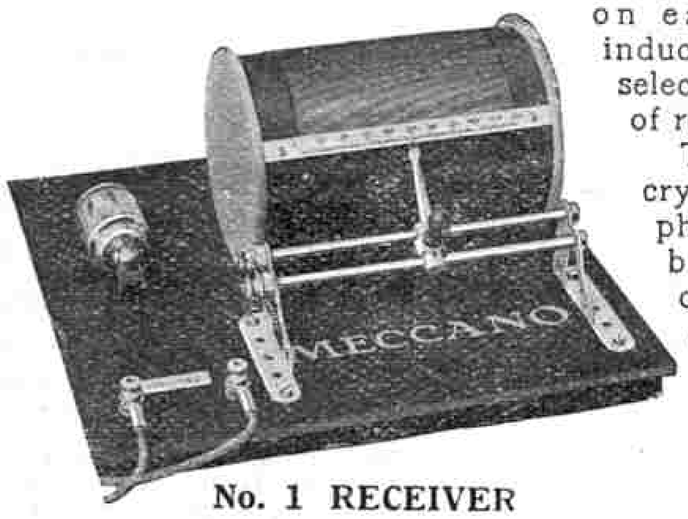
Closing date 31st December, 1924 (Overseas 30th April, 1925).



Listen with a Meccano Receiver

The Meccano Crystal Receiver No. 1 is a highly-efficient and splendidly-finished instrument. The detector is enclosed in a glass chamber, which effectively protects it from dust and moisture. Two slides are provided, one on each side of the inductance, giving great selectivity and clearness of reception.

The usual range of a crystal receiver for telephony is about 20 miles, but the Meccano Receiver with a good aerial should be effective up to 30 miles, according to local conditions, on which the range at over 15 miles largely depends.

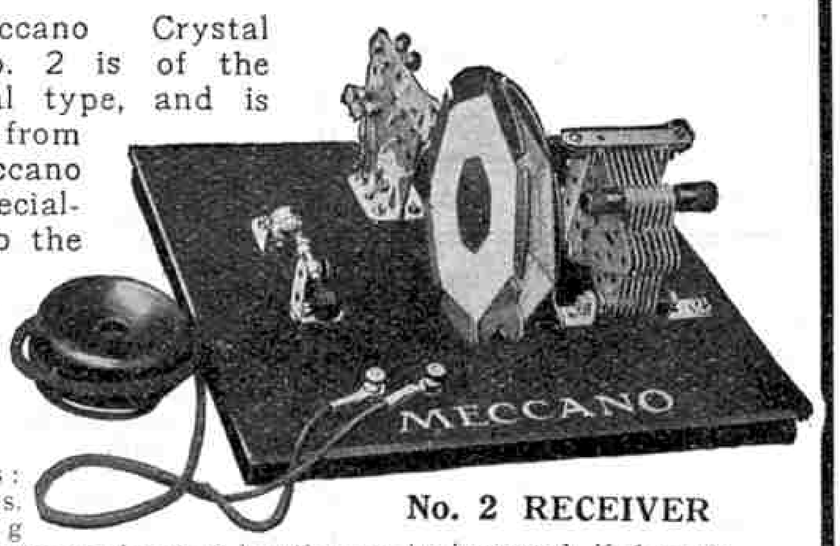


No. 1 RECEIVER

WAVE LENGTHS: Zero to 1,000 metres.
DIMENSIONS OF SET: 9¾ in. × 8¼ in. × 5 in.

R.S.1. (without 'phone) .. PRICE (Post free) **15/-**

The Meccano Crystal Receiver No. 2 is of the constructional type, and is assembled from standard Meccano parts. It is specially adapted to the requirements of those who wish to carry out simple experiments.



No. 2 RECEIVER

WAVE LENGTHS: 300—400 metres. (By adding additional inductances the wave length may be increased if desired).

R.S.2. Parts to make the No. 2 Receiver, complete in strong carton, including single 'phone, 2000 ohms resistance. PRICE (Post free) **22/6**

R.S.2A. Parts, as above but without 'phone .. PRICE (Post free) **15/-**

MECCANO DOUBLE HEADPHONES

British made, 4000 ohms resistance, and of the highest quality procurable, giving loud, clear and undistorted reception. Comfortable to wear and easily adjusted.
PRICE (Postage paid) **15/-**

MECCANO LTD. BINNS ROAD LIVERPOOL

TRICKS, JOKES & PUZZLES



Price 6d Post 2d.



Price 3d & 6d Post 2d



Price 6d Post 2d.



Price 6d. Post 2d.



Price 1/- Post 2d



Price 1/- Post 2d



Price 9d. Post 1½d.



Price 3d & 6d Post 2d.



3d 6d & 1/- post 2d.



Price 2/-. Post 2d.



Price 1/- Post 2d



Price 1/- Post 2d



Price 1/- Post 2d.



Price 1/- Post 2d.

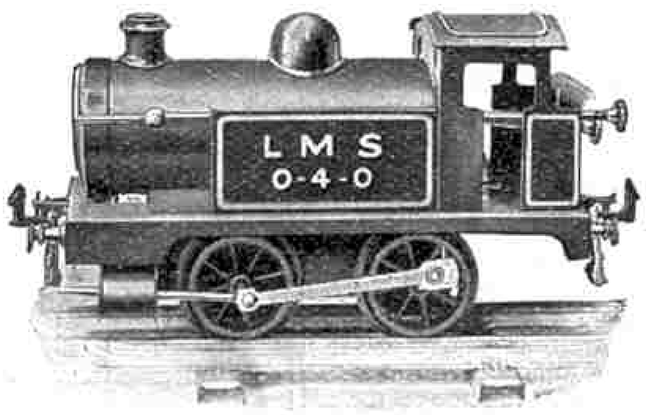


Price 6d. post 1½d

L. Davenport & Co., 15, New Oxford St., London

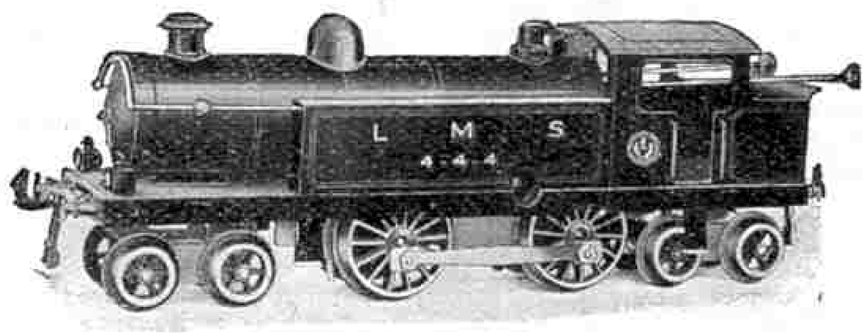
Large Catalogue Tricks, Jokes and Puzzles, 3d. Small Lists Free

HORNBY TANK LOCOS



HORNBY No. 1 TANK LOCO

Strong and durable loco capable of any amount of hard work; richly enamelled and highly finished; fitted with reversing gear, brake and governor.
Gauge 0, in colours to represent L.M.S. or L.N.E.R. Companies' Locos 12 6



HORNBY No. 2 TANK LOCO

Powerful model embodying all the characteristics of the Hornby series. It is 11½" in length and is fitted at both ends with a four-wheeled bogey. Beautifully finished in colours; lettered L.M.S. or L.N.E.R., with reversing gear, brake and governor. Suitable for 2 ft. radius rails only. Price ... 30/-

FROM ALL MECCANO DEALERS

Lives of Famous Engineers

(*Continued from page* 373

bridging of this river was very difficult on account of the violence of the periodical floods. Telford designed a light cast-iron arch of 150 ft. span with a rise of 20 ft. The arch was composed of four ribs, each consisting of two concentric arcs forming panels, which were filled in with diagonal bars. The roadway was 15 ft. wide and was formed of another arch of greater radius, attached to which was an iron railing. Robert Stephenson objected to the use of two dissimilar arches as being liable to subject the structure to unequal strains, but nevertheless this bridge, like many others built by Telford on a similar plan, proved perfectly serviceable.

From the Atlantic to the North Sea

As soon as the construction of Highland roads and bridges was in progress, attention was given to the improvement of harbours around the coast. It would require too much space to describe the many harbours constructed or improved by Telford, but mention may be made of those at Aberdeen and Dundee which, after Leith, the port of Edinburgh, form the principal havens along the East coast.

The construction of a navigable highway through the chain of lochs crossing Scotland diagonally from the Atlantic to the North Sea had long been looked upon as a work of great national importance. As early as 1773 James Watt surveyed the country, pronounced the canal practicable and indicated the best means of construction, but nothing was done in the matter at the time. In 1801 Telford was requested to report on the project, and it is interesting to know that his survey, as regards the most important particulars, agreed closely with that of Watt.

Caledonian Canal Begun

This time the scheme took practical form, and early in 1804 work was begun by the formation of a dock or basin adjoining the intended tide-lock at Corpach near Bannavie. This basin formed the southernmost point of the intended canal. The difficulties of the undertaking were very great. For instance, the difference between the levels of Loch Eil and Loch Lochy was 90 ft., while the distance between them was less than eight miles, and it was necessary to climb up the side of the hill by means of a flight of eight huge locks which Telford named "Neptune's Staircase."

A Great Undertaking

Between the two extremities of the Canal, Corpach on the south-west and Clachnagarry on the north-east, extended the chain of fresh-water lochs. The whole length of the navigation was over 60 miles, of which the navigable lochs constituted about 40 miles, leaving only some 20 miles of canal to be constructed, but of unusually large dimensions and through a very difficult country. The summit loch was Loch Oich, 100 ft. above high-water mark both at Inverness and Fort William, and the navigation had to climb up to this sheet of water by a series of locks from both the eastern and western seas, the total number of these locks being 28.

The construction of all these works in such a wild country involved vast labour and a great deal of anxiety, and many years elapsed before the task was completed. In the meantime the cost of construction had very greatly exceeded the original estimate, and after all, when the canal was opened, it was comparatively little used. This was a bitter disappointment to Telford, and he felt very keenly the attacks made upon the Government because of their expenditure on the undertaking. Telford, of course, was not in any sense responsible for the commercial success or failure of the canal. He was simply called upon to construct it, and having done so in the best possible manner his work was ended.

NEXT MONTH:—

TELFORD BUILDS THE MENAI SUSPENSION BRIDGE.



CHOOSE YOUR OWN CHRISTMAS PRESENT

An opportunity for "*M.M.*" readers

It is a wonderful sensation to sit down and study illustrations and descriptions, and select your own Christmas present. Try it! In our pages this month there are advertisers' announcements of all kinds of splendid toys, books, and all manner of articles for giving pleasure to boys at Christmas. We are going to make at least one boy happy by giving him the very thing he wants, from amongst the articles advertised in our columns.

Let us know what you want—on a Postcard

Look carefully at *all* the advertisements and decide which article you would like the postman to hand to you on Christmas morning. Write the name of it on the top of your postcard, marking it No. 1. Then write the name of the article that you would like second best and mark it No. 2. Do this with six articles altogether, write your own name and address at the bottom in very plain letters, and send the postcard to "Christmas Presents, *Meccano Magazine*, Binns Road, Liverpool."

To the sender of the list that corresponds most nearly in order of merit with the total voting we will post the article that heads his list, to reach him on Christmas morning.

"Christmas Presents" postcards must reach us not later than 20th December.

Miniature Railway System—

(*Continued from page* 407)

As the train is likely to be travelling at a high speed when the driver first sees the "distant" signal, it is clearly necessary that this signal should be sufficiently far in advance of the "home" signal to allow the driver time to pull up at the latter if required. The standard distances from "distant" to "home" vary from 600 yards on a rising gradient to 1,000 yards on a falling gradient.

As long as the "home" signal is at danger the "distant" signal also is kept at danger, and the driver slows down and proceeds cautiously towards the "home" signal. If the latter is at danger when he reaches it he must stop dead, and must on no account go on until the signal is lowered to the "all right" position.

Starting Signals

The third signal to be reached is the "starting" signal, the function of which is to prevent a train that has passed the "home" signal from starting away until the line ahead is known to be clear. Sometimes there is a cross-over road or a siding connection ahead of the "starting" signal. In such cases a fourth signal is necessary and this is called an "advanced-starting" signal. The shape of "starting" and "advanced-starting" signals is similar to that of "home" signals. Fig. 1 shows the relative positions of the various main line signals at a small station.

NEXT MONTH:—

SIGNALLING ON A MINIATURE RAILWAY

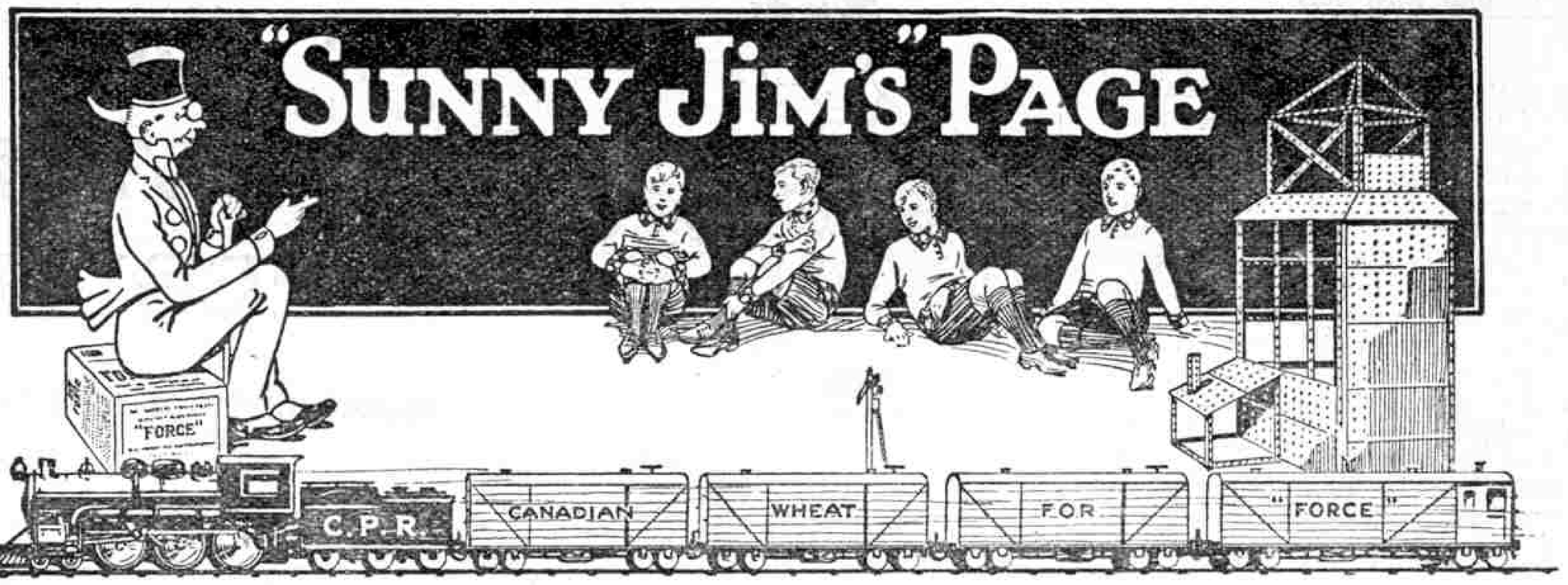
Next Month:

Our next issue will be published on the 1st January. The price is 3d. and the Magazine will include the following splendid articles, in addition to our regular features:—

The World's Mightiest Electric Loco
Giant Block-setting Cranes and Their Work
The Menai Suspension Bridge
Stamp Tour Round the World
Discoveries in Meccanoland (Part II)
The New "Flying Scotsman"
Taking Care of Bicycles in Winter
The Triumphs of Famous Men over Poverty
Electric Signs and How they Work

Order your copy to-day from your Meccano Dealer, or from any Newsagent

Are you having a Party at Christmas ? Can you Act ? Try ! It's Easy—and Great Fun !



SOLUTION TO LAST MONTH'S PUZZLE *(Sunny Jim had hundreds of solutions sent him):*
"FORCE" IS WHEAT—MADE NICE TO EAT, READY TO SERVE, WITH HOT MILK.

A CHARADE FOR CHRISTMAS!

(To take about 10 minutes).

Learn this and act it at the party. See if your friends can guess the hidden sentence. There's a hidden word in Act I, another in Act II., another in Act III., and the whole three words (*Everybody likes "FORCE"*) in Act IV.

You and a friend can do it. Only two characters are needed. A "stage" is easily rigged up. No scenery is required—just a curtain and someone to work it. Father Christmas's costume is easily made at home. Mother will make up Sunny Jim's suit from a paper pattern that can be had if you apply now to Dept. M.C. 4, c/o Sunny Jim, 197, Gt. Portland Street, London, W.1., and send with your letter four penny stamps and the lid of a "FORCE" packet. *Send at once and have this jolly charade as a surprise for your Christmas party !*

A Christmas Ad-venture

Characters :
Sunny Jim and Father Christmas.

ACT I.

Hidden word—(*Everybody*).

S.J. *enters.* (*To himself*) "High o'er the fence leaps 'Sunny Jim,' 'FORCE' is the food that raises him."
(*To audience*) Yes, and Sunny Jim is not the only one who was raised on "FORCE"—there's many a man to-day who can say the same. *Everybody* who tastes "FORCE" wants more—but I'm beginning to talk like an advertisement. I saw Father Christmas coming along the road a short time ago—why, here he is !

F.C. (*enters puffing under weight of well-loaded sack*). S.J. Hello, Daddy Christmas! You don't seem to be very happy. Trying to carry something for *everybody* I'll be bound.

F.C. (*lowering sack*). Ha ! That's a weight off my chest.

S.J. You mean your back.

F.C. No, I can still feel the load in my bones (*swings his arm*). That's better ! (*Sits on sack. Puts head in hands*).

S.J. You've not got rid of *all* your troubles, *I* can see. There's something on your mind. Now tell me, what's wrong ?

F.C. My job is to be happy and to bring happiness to others, but there are so many boys and girls, and I *can't* get round to *everybody*. *Everybody* wants a present at Christmas Time and my poor feet get so tired.

S.J. You have a sledge.

F.C. That's no good from house to house.

S.J. Of course not. You should try *my* method. *I* give presents to *everybody*. *Everybody* knows "Sunny Jim," but I don't trudge round to *everybody* like you do. Listen.
(*Sits on sack with F.C. and acts as though talking to him*).

Curtain.

(*During interval audience has to guess hidden word*).

ACT II.

Hidden word—(*Likes*).

Curtain rises on S.J. and F.C. still talking.

F.C. I like your scheme, Sunny Jim. It would save me heaps of time. You say that you regularly send free samples of "FORCE" to anyone who *likes* to ask. You simply wrap them up and put them in the post. The postman does the work of distributing.

S.J. Yes, that's it !

F.C. You say you post to whoever *likes* to enquire.

S.J. Certainly.

F.C. That's just what I'd like to do. All I'd want, then, would be an office like yours. I could sell my reindeers.

S.J. You give the scheme a trial. Everybody *likes* receiving things through the post. It's *so* exciting.
(*Both rise*).

F.C. Thanks for your advice, Sunny Jim. I'm glad I met you. You are the kind of man everyone *likes* to meet. Good-bye.

S.J. Good-bye.
(*Exit F.C.*)

S.J. And everybody *likes* FatherChristmas.
(*Curtain*).

(*Audience guesses hidden word*).

ACT III.

Hidden word—(*"FORCE."*)

Curtain rises on F.C. seated on sack.

F.C. I don't seem to be able to do things like Sunny Jim. He said this posting scheme served him successfully. We both give away presents—yet he succeeds where I fail. I can't get anyone to write to me ! I suppose it's because they don't know my address. I'll have to buy my sledge back again and leave my card at every house. *That's* what I'll have to do !

Enter S.J.

S.J. What did you say you'd do ? Nonsense ! Do as I do, Father Christmas, *advertise !* I advertise in lots of ways, in the Meccano Mag., to tell Meccano boys all about "*FORCE.*" Then they write to me for my free samples. Do as I do and you will find it as simple as serving "*FORCE.*"

F.C. Without you to *force* me I'm afraid I'd not think of such things. How shall I start ?

S.J. Like this. (*They both turn backs to audience while S.J. talks excitedly*).

Curtain.

Audience guesses hidden word.

ACT IV.

Hidden sentence—(*Everybody likes "FORCE."*)

S.J. and F.C. are seated on sack, backs to audience, both busy with paper and pencil.

S.J. *Everybody likes "force"* in an advertisement. Make it bold and strong.

F.C. *Everybody likes "FORCE"* in an advertisement ? I'm advertising toys for Christmas !

S.J. I don't mean *real* "FORCE"—not the whole wheat flake food. I mean *strength.*

F.C. But "FORCE" gives strength to those who eat it.

S.J. Of course it does. I meant to say that everyone likes *vigour* energ—

F.C Vigour, vim, per-fect trim, "FORCE" made him "Sunny Jim." Ha ! Ha ! (Both rise and shake hands).

S.J. You're right, Santa Claus. 'Vigour and Vim' is the "FORCE" slogan. You look full of it.

F.C. Well, I have it every day.

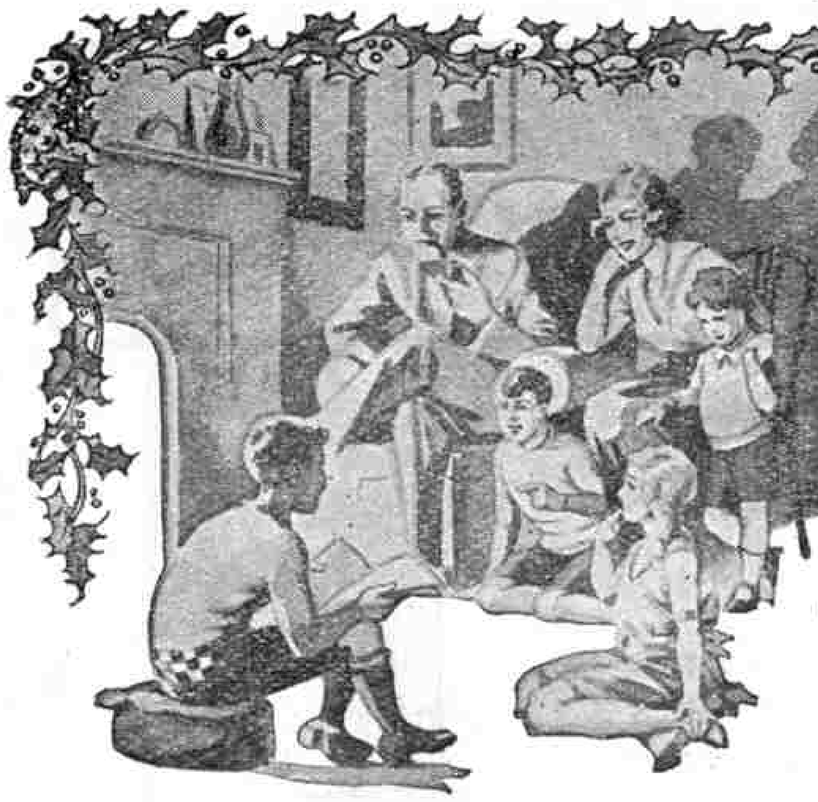
S.J. What, Vim ?

F.C. No, "FORCE."

Both. The food *everybody likes.*

Curtain.

If you have never tasted "FORCE," send a Post Card to "Sunny Jim" and he'll send you a generous Free Sample.

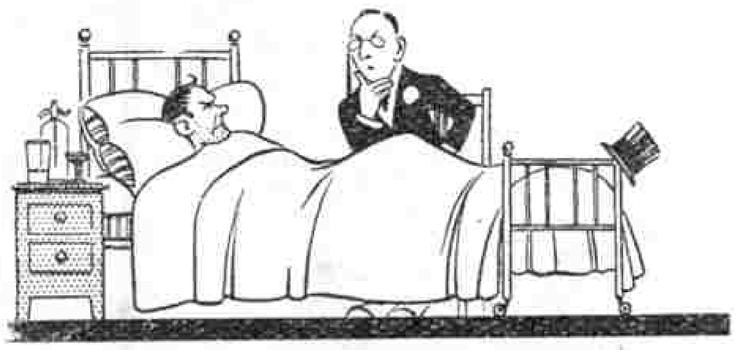


Fireside Fun

THE weeks round about Christmas are essentially the time for jokes and laughter and also for testing the quickness of our wits by means of riddles and puzzles of all kinds. This month, therefore, I have decided to confine the "Fireside Fun" page entirely to jokes and riddles, together with the answers to last month's puzzles, and to devote the whole of another page to a big puzzle competition. I hope that a very large number of my readers will tackle these puzzles and send in their solutions according to the instructions on page 379.

From the letters I receive it is quite evident that the majority of my readers like to have a few good puzzles to worry out, and next year I hope to introduce a number of novelties in this direction. While on this topic I should like to draw the attention of my readers to the great possibilities of Meccano in connection with puzzles. One such puzzle is given on the page 379, and I shall be glad to receive any suggestions for others of a similar nature.

* * * *



Doctor: "I think you are coughing easier this morning."

Patient: "I ought to, considering the practice I have had during the night!"

* * * *

Foreman: "Why are you so late this morning, Murphy?"

Murphy: "Shure I overslept myself, sir. I dreamt I was at a football match that ended in a draw. The referee ordered extra time to be played, and I stayed to see the finish!"

* * * *

Q. What man is the slowest writer?

A. The convict; he sometimes spends 15 years on one sentence!

* * * *

Q. Which side of his face does the Meccano Guild Secretary shave first?

A. The outside, of course.

* * * *

Teacher: "Johnnie, what is 'velocity'?"

Johnnie: "What a man let's go of a bee with!"

This Month's Short Story

Boy, pliers,
Electric wires,
Blue flashes,
Boy ashes.

* * * *

At a certain hotel an Englishman, an Irishman and a Scotsman were arguing as to which of their respective countries had the lightest men.

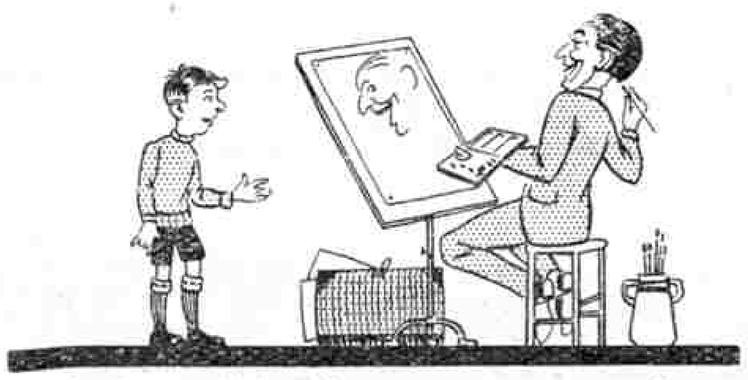
The Irishman said: "We have men of Cork."

"That may be," said the Scotsman, "but we have men of Ayr."

"Well," said the Englishman, "that is certainly very light, but we have lighter-men on the Thames!"

* * *

VERY LIKELY!



Artist: "A clever artist, my boy, can turn a smiling face into a sad one with a few strokes of his brush."

Boy: "That's nothing to brag about; my father can do it with one stroke of his stick."

* * * *

Bootmaker (to applicant for job): "Do you know anything about boots, my boy?"

Boy: "Well guv'nor, I ought to, I've got the boot from every place I've had!"

* * * *

SHOT OR NOT?

A duel was fought in Texas recently by Alexander Shott and John S. Nott. Nott was shot and Shott was not. On the face of it, therefore, it is better to be Shott than Nott. A rumour has been circulated that Nott was not shot, but Shott declares that he shot Nott and therefore either the shot shot at Nott was not shot or Nott was shot notwithstanding. It may be that the shot Shott shot shot Nott, or possibly the shot Shott shot shot Shott, when the whole affair would resolve itself into its original elements, and Shott would be shot and Nott would be not. We think, however, that the shot Shott shot shot not Shott but Nott. Anyway, it is hard to tell who was shot and who was not.

(*Contributed by J. E. Bentley, 81, Abbey Lane, Stretford*).

Answers to Last Month's Puzzles

No. 37 Missing names of motor cars:—

Tom and I had a little argument and he spoke quite *CROSSLEY* to me. The trouble began about a man called *MORRIS. OXFORD* was written all over him, and although he had been a bit of a *ROVER* he was not a bad sort. He was a good *SINGER* and even if he were not a *STAR* his *STANDARD* was high. Tom, however, did not like him. One evening while Tom was on holiday in *ESSEX* he was crossing a stream at the *FORD* when he met this man. Tom was not *SWIFT* enough to *DODGE* him, and he had to stay and chat for a while. The only thing that made him feel resigned was the weather, for scarcely had the last *SUNBEAM* departed when the *MOON* rose, and occasionally a *METEOR* flashed.

* * * *

No. 38. Hidden names:—

(a) Emu. (b) Gnu. (c) Eland. (d) Shag. (e) Antelope. (f) Gnat. (g) Tiger. (h) Anaconda. (k) Armadillo.

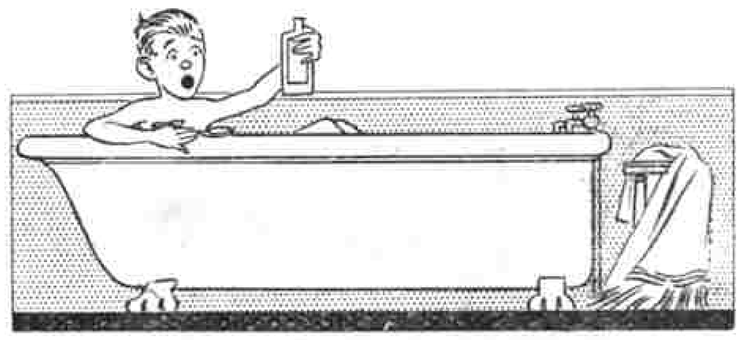
* * * *

No. 39.

The cat begins to count from the sixth mouse.

* * * *

No. 40 North, South, East and West.



Smith minor: "I hear the doctor has been to see you."

Jones minor: "Yes. I am having three baths every day."

Smith minor: "What on earth for?"

Jones minor: "The doctor gave me some medicine and told me to follow the directions on the bottle, which said: 'One tablespoonful to be taken three times a day in water.'"

* * * *

Lady (to mother of girl who has just been reciting): "Your girl recites very well."

Mother: "Yes, all she needs is a bit of electrocution to finish her off!"

* * * *

Q. When is a rest not arrest?

A. When the police are asleep.

* * * *

Q. What kind of dog is always 3 ft. long?

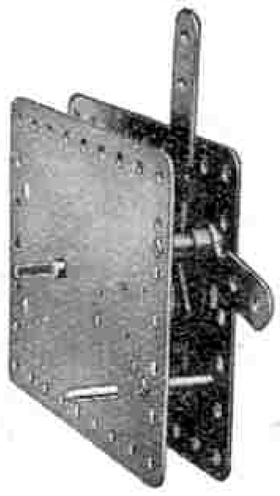
A. A yard dog!

Buy them all at Hobbies!

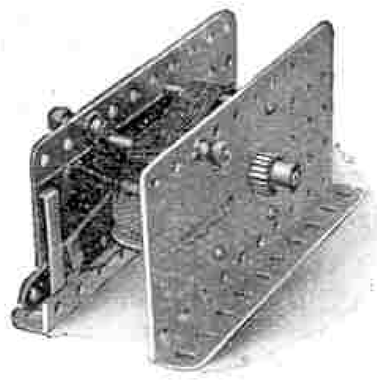
MECCANO



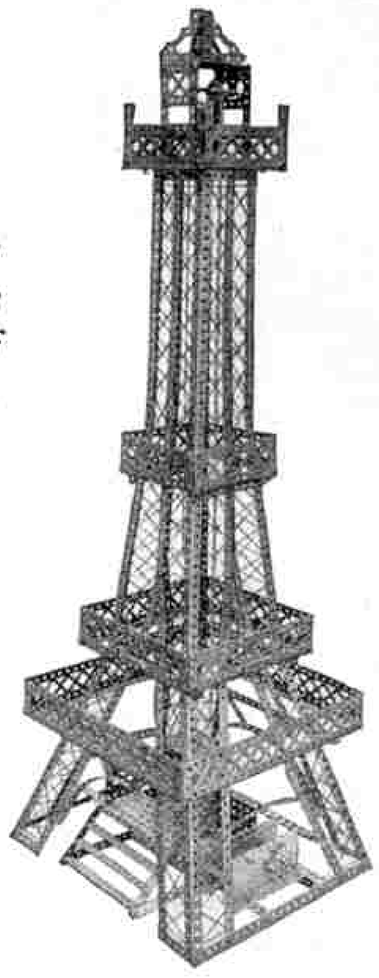
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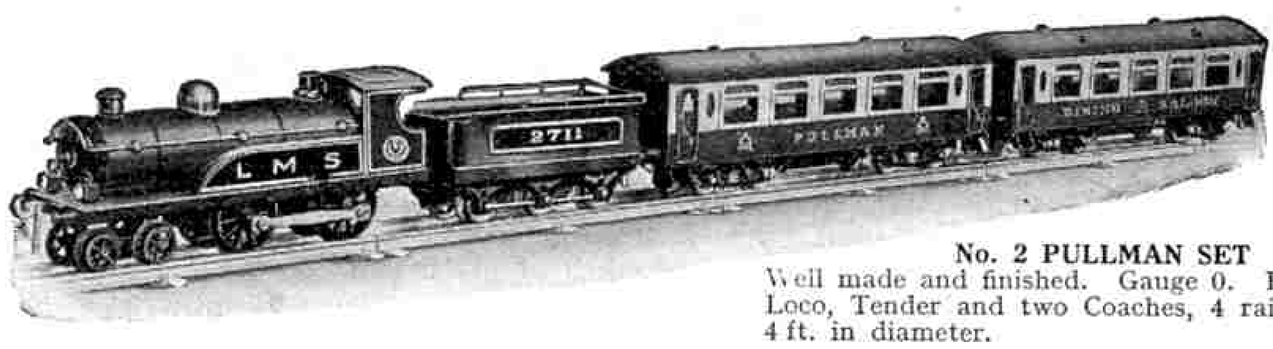


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No. 0 ,, ...	**5/–**	No. 5 ,, (Carton)	**55/–**
No. 1 ,, ...	**8/6**	No. 5 ,, (Wood)	**85/–**
No. 2 ,, ...	**15/–**	No. 6 ,, (Carton)	**105/–**
No. 3 ,, ...	**22/6**	No. 6 ,, (Wood)	**140/–**
		No. 7 Outfit (Wood) ...	**370/–**

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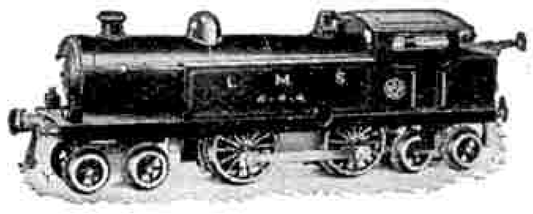
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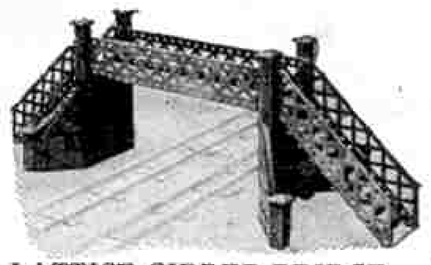
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Fun with Bricks

Building houses with miniature bricks is a fascinating pastime that appeals to almost everyone. The artificial stone bricks made by Messrs. Lott's Ltd. (Watford, Herts.), are unique in their wonderful variety. The Tudor blocks are specially interesting, for by means of them realistic models of the old-fashioned half-timbered houses may be built and completed with trees, fences, etc. Lott's Bricks may be used with great success in making stone bridges, viaducts, and other accessories for use with a Hornby Railway.

25 Prizes !

We would draw our readers' attention to the Tan-Sad Picture Puzzle Competition advertised on page 424, in which 25 useful prizes are offered. The firm manufacture scooters, which toys do not appear to be losing any of their popularity. The various types produced by Messrs. Tan-Sad Ltd. are perfect little models. They are strongly made in various grades varying in price from 10/- to 21/-, and all are of good appearance. The 21/- model has a footboard mounted on spiral springs that absorb shocks on rough roads and enable a much greater speed to be attained.

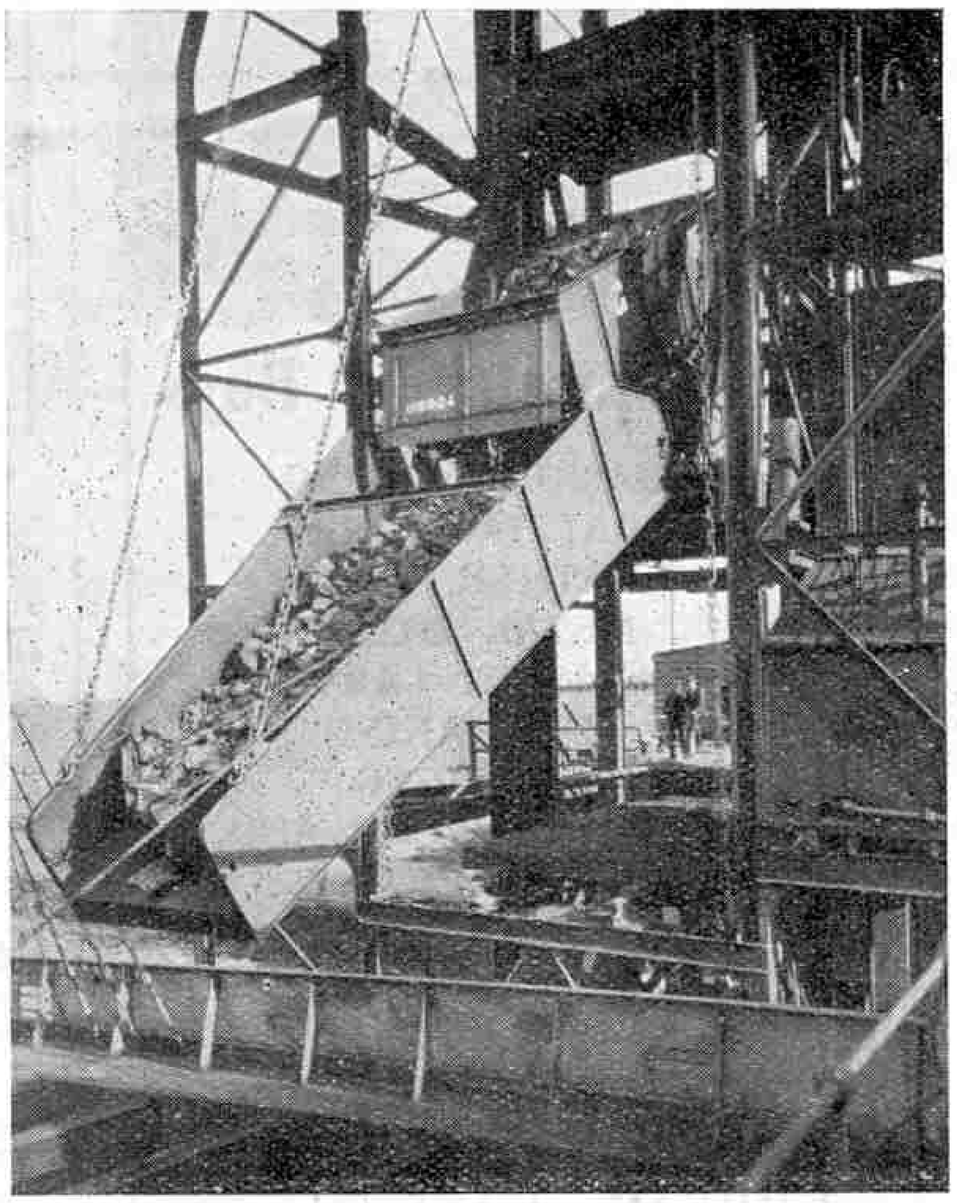
Can you Shoot?

The best games for winter evenings are those in which every member of the family can join. This means that the games must not be too complicated and must provide plenty of fun and excitement. With this end in view Messrs. Rickarby & Partner (37a, Finsbury Square, London, E.C.2) have produced two new games "Popskit" and "Popsnooka." The games consist of shooting a captive cork missile from a spring gun with the object of knocking down coloured skittles, which count different scores. The spring gun is strongly made and reliable, and considerable skill is required to make a good score. These games are very suitable also for bazaars, exhibitions, etc.

A Real Xmas Bazaar

There can be very few British boys who have not heard of Gamages wonderful Christmas bazaar, where every year there is an amazing display. Fortunate indeed are those boys who are able to visit this bazaar and see its treasures for themselves. For those who are unable to do this, a large illustrated Xmas Bazaar catalogue has been prepared. This is packed with descriptions and illustrations of everything dear to the heart of every boy, and a copy will be sent to any reader who writes for it and mentions the "*M.M.*" Apply promptly, as in spite of the enormous numbers printed, supplies will soon become exhausted.

High-Speed Ship-Coaling



Courtesy] [*G.W.R. Magazine*

Tipping the first of the new 20-ton Coal Wagons at Port Talbot Docks. (*See page* 387)

Fine Model Launches

The fretwork outfits and materials manufactured by Messrs. Hobbies Ltd. (Dereham, Norfolk) are always in great demand for Christmas presents, and this year their quality and variety appear to be better than ever. We strongly advise readers interested in fretwork or carpentry to write for a copy of Messrs. Hobbies 1925 catalogue, which will be sent post free for 9d.

Those interested in model boats will find that Hobbies' launches (ranging in price from 9/6 to 30/-) represent remarkable value. Each launch is strongly made of the best materials and is sold under guarantee. The power units are unusually good, heat being generated by a well-designed lamp. A good head of steam is very quickly obtained, the lamp containing sufficient methylated spirit to drive the larger sized boats at a good speed for 20 minutes. "Peggy," for instance, price 22/6, will cover a mile on the straight at one fill.

A Rifle without a Licence

The B.S.A. bicycle has a big reputation behind it, due to the fact that the high standard of quality of the firm's machines has been consistently maintained in every detail. The various models cover a wide range to suit every requirement, whether touring or racing, a particularly interesting machine being the "All-Weather" bicycle, rust-proof finished throughout with very efficient mud-guarding.

Parents often hesitate to buy guns for their boys on account of the possible danger, but this objection is largely eliminated in the B.S.A. air rifle, which is perfectly safe to use. Although strong and accurate, it is sufficiently light for a boy or lady to handle easily. It is, of course, smokeless and practically noiseless and no cartridges or powder are required. The rifle is sufficiently powerful to kill a rook or sparrow at 50 yards, and at the same time is accurate enough for exacting target work. No licence is necessary to purchase or use it in house or garden in Great Britain.

Saving Life by Wireless—(*cont. from page* 389)

ablaze with light, and with their searchlights concentrated on the stricken vessel. Their decks were crowded with passengers, and it is estimated that some 7,000 spectators were watching the "*Volturno.*" Shortly before midnight an explosion destroyed the "*Volturno's*" dynamos, extinguishing her lights and compelling her wireless operator to work on accumulators.

Meanwhile the "*Carmania's*" wireless operator had been sending out far and wide an urgent call for help from any oil tank steamer that might be in the neighbourhood, and presently a response came from the captain of the "*Narragansett,*" "I will be with you by five o'clock." Steaming at her utmost speed, the "tanker" arrived at daybreak and at once commenced to pour out two great streams of oil, which formed a calm area of water at the stern of the "*Volturno.*" By this time also the gale had moderated a little and a great flotilla of boats put off from the various liners and gathered in the oil-calmed area. The work of rescue was quickly and skilfully carried out, and by nine o'clock in the morning the 521 passengers and crew were safely removed. Of the 136 persons who lost their lives, about 50 were killed by explosions and fire, and the remainder were drowned while endeavouring to launch boats before the arrival of the "*Carmania.*"

These are two typical examples of the life-saving work of wireless telegraphy in its early days. There have been many others since, and especially during the war, when ships were being sunk daily by enemy submarines. At that time "S.O.S." signals were very frequent, and it is believed that during the war-years alone the lives saved by means of wireless must number hundreds of thousands.

How an "S.O.S." is Sent Out

"S.O.S." does not stand for "save our souls" or "send out succour," nor indeed for any other similar phrase, as many people appear to believe. The three letters were chosen because they make a rhythmic signal in the Morse code. As most of our readers know, the "s" signal in Morse consists of three dots and the "o" signal of three dashes, so that when "· · · – – – · · ·" is repeatedly sent out its peculiar rhythm at once attracts the attention of all who are listening. There is no pause between the letters, the three dots, three dashes and three dots being sent out as though they signified one letter only. The distress call is always sent out with the full power available and with untuned signals, and it thus "jams" all other stations within range, whatever their wave-length.

After repeating "S.O.S." several times, the ship gives her position in longitude and latitude and states briefly the nature of the trouble, how long she expects to remain afloat, and so on. The operator then switches over to his receiving set and listens for a reply. If none is received he repeats the original message.

DRAG-LINE CONTEST

The Result of this Contest will be announced next month

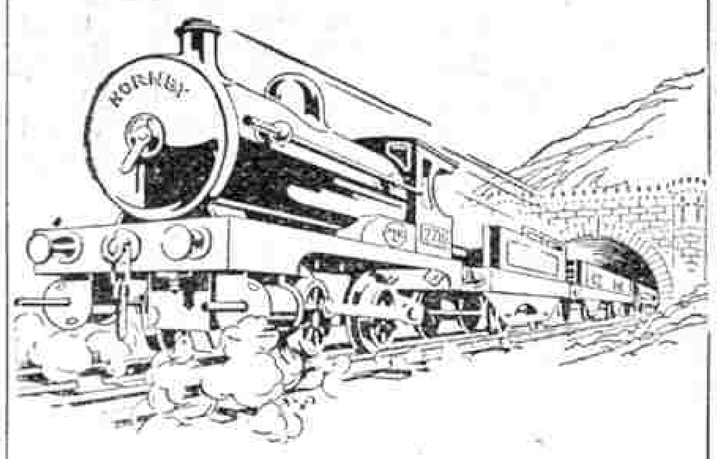
A New Meccano Model—(*cont. from p.* 387)

7 holes, and the truck runway Girders are secured to the inner ends of the grab runway rails (3) by two 12½" Strips (5), overlapped 7 holes.

The grab rails (3) are spaced centrally in the head of the tower by means of a Rod (6, Fig. A) which is passed through the second hole from the end of the Angle Girders, and fixed by Collars (7) on the outer ends of the Rod and by other Collars (8) which fit closely against the outer sides of the rails.

The extreme ends of the Angle Girders are connected by 3½" Strips (9a) and 3½" × ½" Double Angle Strips (9) connect the upper 12½" Strips (10). The lower truck rail Angle Girders (3) are maintained centrally in the tower by being bolted to the transverse Angle Girder (11) and the Strips (10) of the truck runway by means of Angle Brackets to the Angle Girder (2). The other details of construction of these rail arms and the tower and tower-head can be clearly followed from the illustrations.

(*To be continued*)



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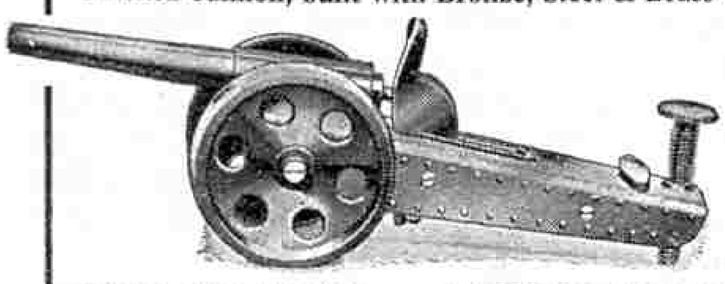
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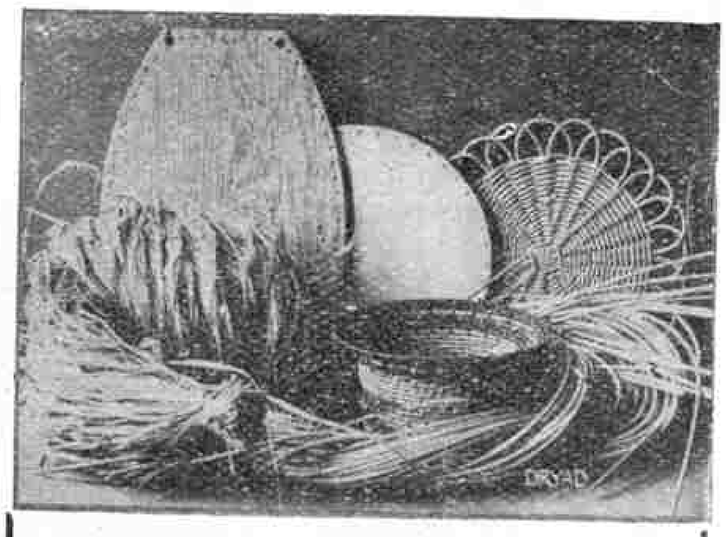
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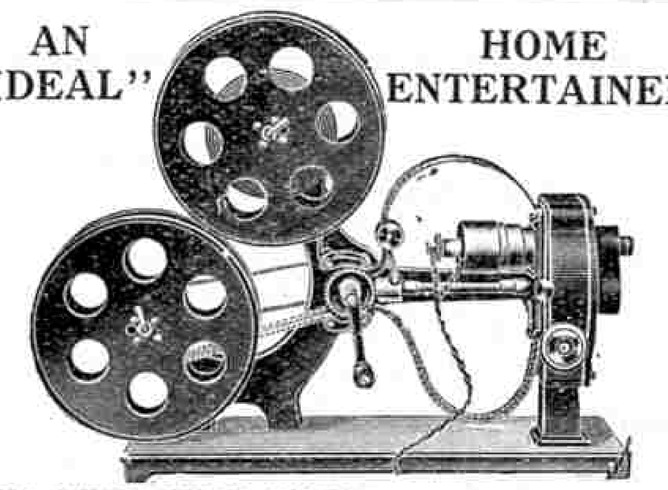
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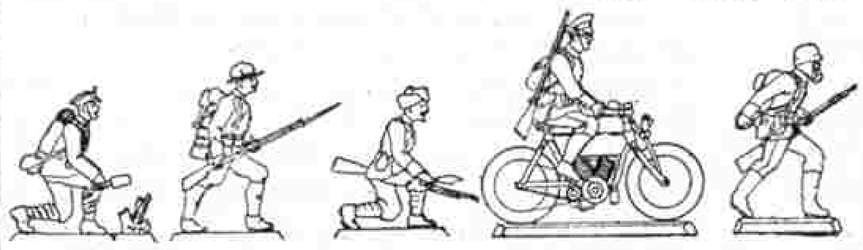
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BOY HEROES OF THE MONTH

In every community there are boy heroes whose deeds are unknown beyond a small radius. Boys are but men in the early stages and their personal courage does not lose anything by comparison with that of men. Some boys even succeeded in joining the Army during the war by all manner of daring expedients and acquitted themselves like men in France and elsewhere—there were Jack Cornwalls in every branch of the Service.

In time of peace there is no dearth of boy heroism and as opportunity allows I propose to describe on this page any brave deeds that come to my notice. I shall be pleased to receive from readers of the "*M.M.*" descriptions or news cuttings of any such deeds that they consider will be of general interest.—*The Editor.*

A fine example of bravery and devotion to animals is shown by the gallant action of an old "*Warspite*" boy. Glencoe Veness had been out fishing with a friend when he heard the bark of a dog coming from a cliff about 150 ft. in height. Making their way to the top of the cliff, the boys found that a sheep-dog had fallen over the edge of the cliff and landed on a ledge some 50 ft. from the top. A rope was obtained and Veness, being the heavier of the two, lowered his friend down the face of the cliff. It was a difficult and dangerous task to secure the frightened animal, but it was finally accomplished, and the dog was soon safely hauled up the cliff. Although uninjured except for some slight cuts on his front paws, he was found to be so weak from starvation that he was scarcely able to stand. The R.S.P.C.A. have heard of the incident and Veness and his friend have been awarded medals for their brave rescue.

Dives Under Barge

A gathering of heroes took place recently in the old County Hall, London, when 71 boys were awarded framed certificates for deeds of valour. Among this gallant group was William Blench, aged 14, who saved the life of a little girl when she fell into the Thames and was carried under a barge. Without a moment's hesitation Blench threw off his coat and plunged in to her rescue. He had to dive under the barge several times before he finally managed to reach her.

Performing a Public Duty

The power of observation of two London boys, aged nine and eleven, succeeded recently in bringing a thief to justice, and is well worthy of mention in these columns. The boys Bernard Rowlands and James Sutherland, were playing in the road when they saw a man take a coat from a motor-car. Recognising him as a labourer who lived not far from their home, they informed the police, and the thief was arrested and charged with theft. On sentencing him to imprisonment the magistrate complimented the boys on their action. "You are only schoolboys," he said, "but you have performed a public duty, and we greatly appreciate your action."

Two Young Heroes

A gallant feat, which at first sight seems to be almost incredible, is that of Joseph Fitzmaurice, of Tyldesley, Lancashire. Although only six years of age, he recently saved the lives of tw girls who were drowning in the river Glass. Unfortunately, we have not been able to obtain the full particulars of this brave deed, but there is little doubt that Joseph is one of the youngest heroes in the world.

Frank Harmer, of Shotton, near Chester, dived twice into the river Dee in a heroic but unsuccessful attempt to save a school chum from drowning. He has been awarded the Royal Humane Society's vellum certificate with the additional honour of having it autographed by the Prince of Wales.

Saves Kitten

Another striking example of bravery and devotion is that of Frederick Blake, a newsboy of Chertsey, who, at imminent risk of his own life, rescued a kitten from the track of an express. Blake, who is a member of the Boy's Brigade, has been promoted to the rank of Corporal in recognition of his gallant action—an honour that he well deserves.

Scout Stops Runaway Horse

Boy Scouts and Wolf Cubs are always to the fore in brave deeds, and the following instance has been brought to my notice by a Scoutmaster.

During a recent sports-day, held by the Romford Wolf Cubs, a large van was standing near the race track, which was lined with spectators. Suddenly something startled the horse and it bolted, heading straight for the crowd of people, who were so absorbed in watching a race that they did not realise their imminent danger. Assistant Cub-Master A. C. M. Gooding grasped the situation, however, and ran to meet the galloping animal. Hanging on to its head he diverted it from the spectators and was finally able to bring it to a standstill. We are pleased to record that in recognition of his bravery and presence of mind, Gooding has been awarded the Silver Cross by Sir Robert Baden Powell, the Chief Scout.

Saves Sister from Fire

Another instance of prompt action is furnished by the deed of Patrol-Leader Joseph Farrar, attached to the South-East Leeds (Stourton) troop. His sister was bending over a fire in the house when her clothing caught fire. Farrar immediately dashed into the room and succeeded in extinguishing the flames, though in doing so he was badly burned. The brave deed was well worthy of the Gilt Cross that was presented to Farrar by the Commissioner for South-East Leeds.

Scout Heroes

Two boy members of the 1st Hathersage B.P. Cub Pack have also received public recognition for their bravery in saving a boy from drowning. Thomas Dobson, a 15-year-old Newcastle boy, has been awarded the Royal Humane Society's vellum and a silver medal for a similar brave deed.

Other awards made by the Royal Society include three certificates presented to the following 13-year-old boys: John Selby, of Limehouse; John Toothill, Shoreditch; and Jack Emmerton, of Paddington. Their names are to be inscribed on the brave deeds boards at their respective schools for gallantry in saving life from drowning.

Fire at Reformatory

Some time ago a serious outbreak of fire occurred at the Adel Reformatory School near Leeds, and was only extinguished by the bravery of the boys. Official recognition of their gallantry was made by the Home Secretary, who in a letter to the managers requested that the boys be given a half-holiday. "The behaviour of the whole school was worthy of the high tradition of the school," wrote the Home Secretary, "and the boys who were specially chosen to cope with the fire not only showed an admirable contempt of danger, but also worked with such intelligence that a large amount of material was saved from destruction." Perhaps even more appreciated by the boys than the half-holiday was the £10 note sent by the Home Secretary to supplement their usual pocket-money!

A Modern Hercules

A London reader sends us a note regarding Saxon Brown, a 19-year-old boy who possesses great strength. At first Saxon Brown was a weakly boy, but by means of exercises devised by himself he has become wonderfully strong and hard. Now, for two minutes, he is able to bear on his chest an anvil weighing a quarter of a ton, while four men rain blows upon it with 10-lb. sledge hammers! He can also support a bridge on his chest while a motor car drives across it! Other feats that this modern Hercules performs are tearing a pack of cards in two; nailing three thick boards together with a single blow *with his fist*; making a spring of an iron rod, by twisting it round his wrist; breaking chains with his teeth; tying iron bars into knots; lifting five men; and holding ten men pulling in opposite directions. Saxon Brown claims to be the strongest boy in the world, and we don't think there are many readers of the "*M.M.*" who would care to challenge his right to the title!

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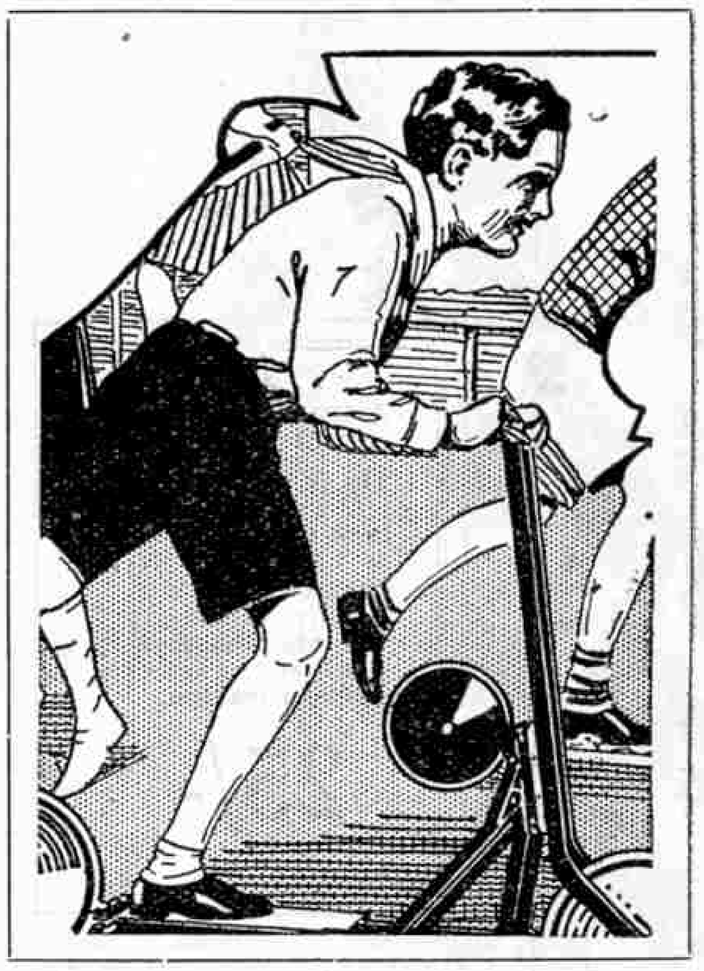
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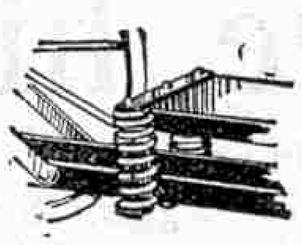




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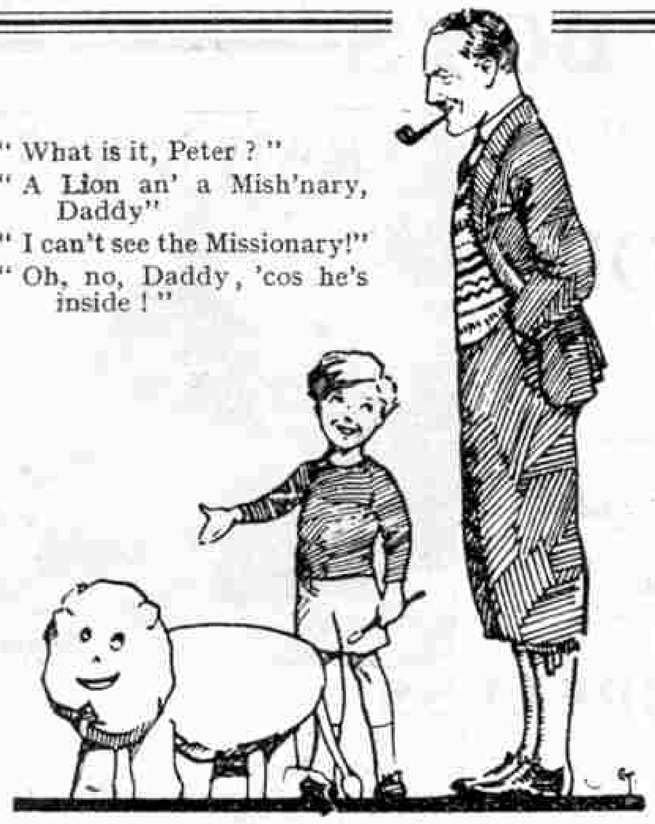
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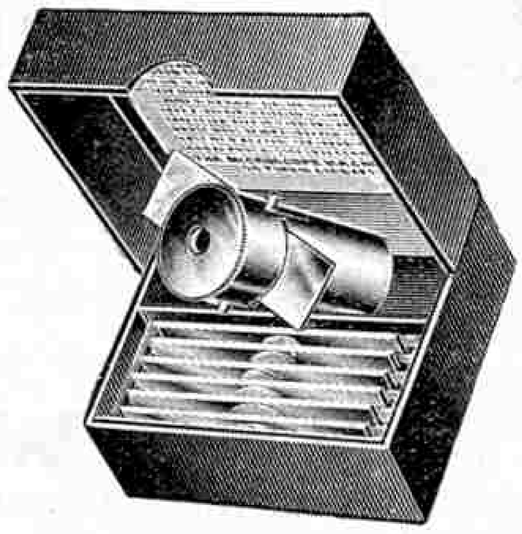
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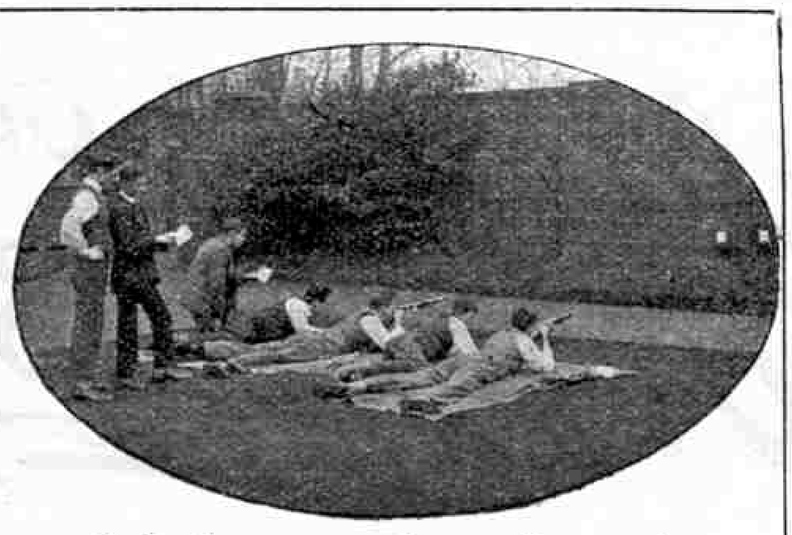
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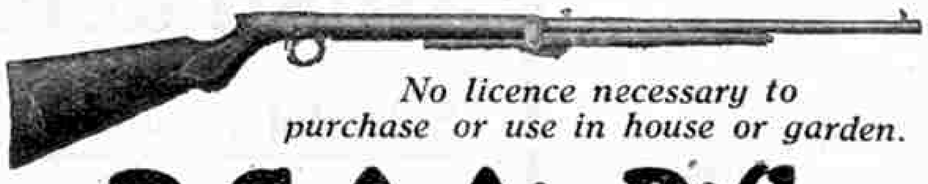
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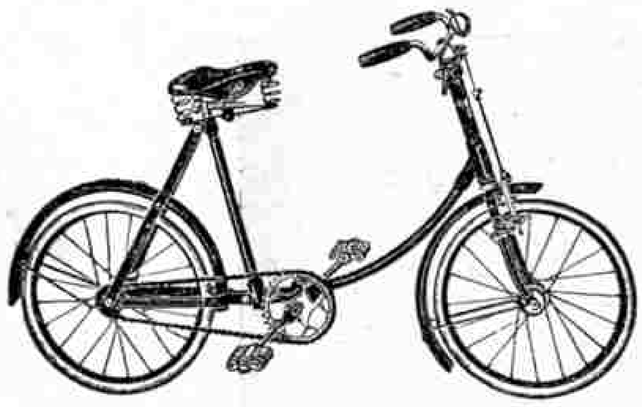
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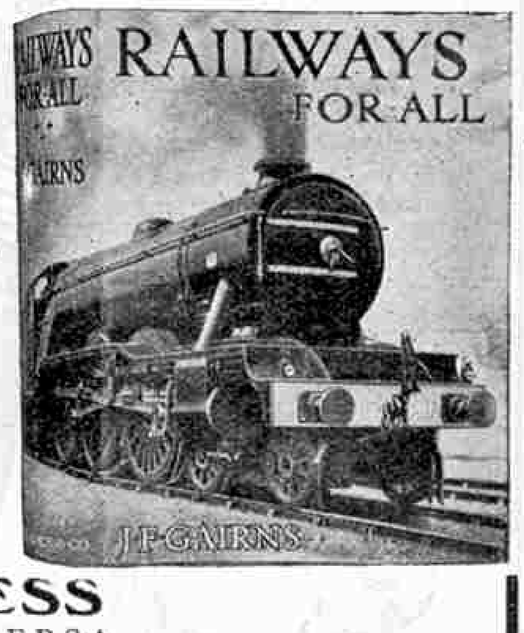
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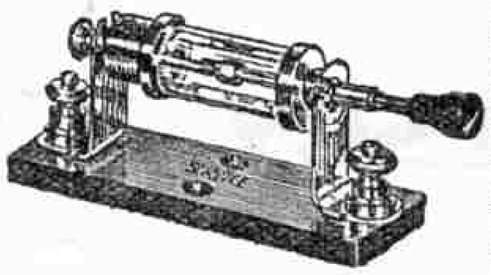
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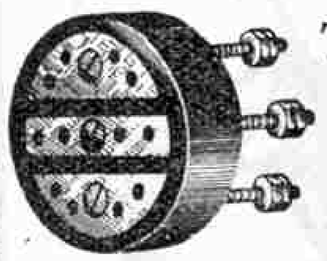
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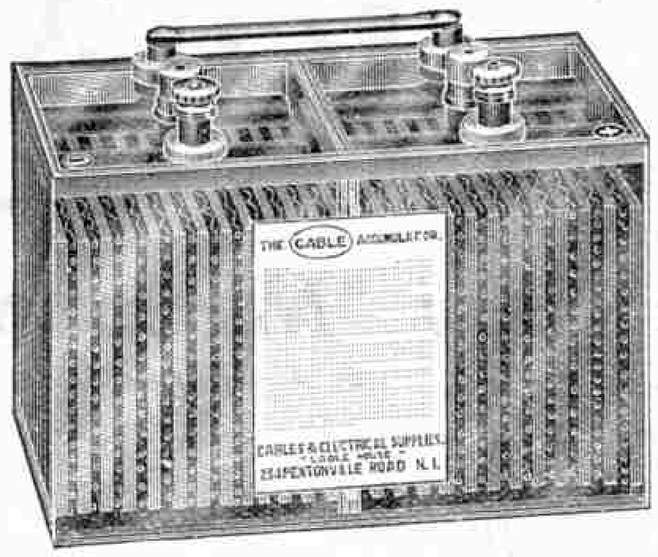
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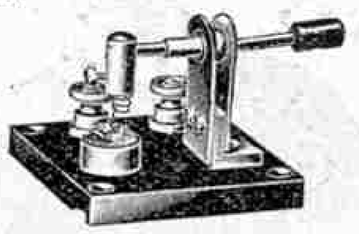


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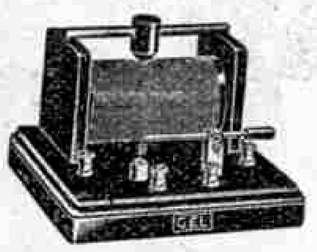


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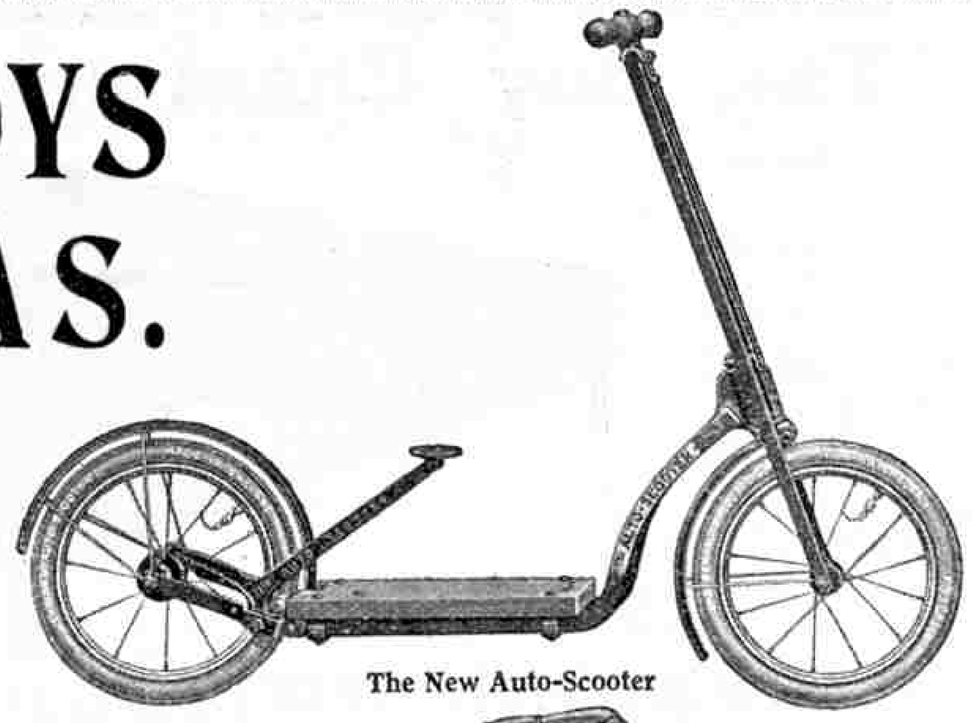
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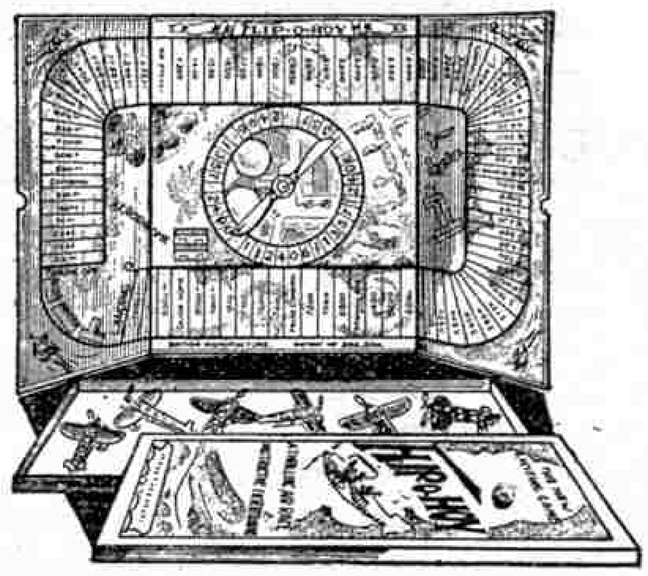
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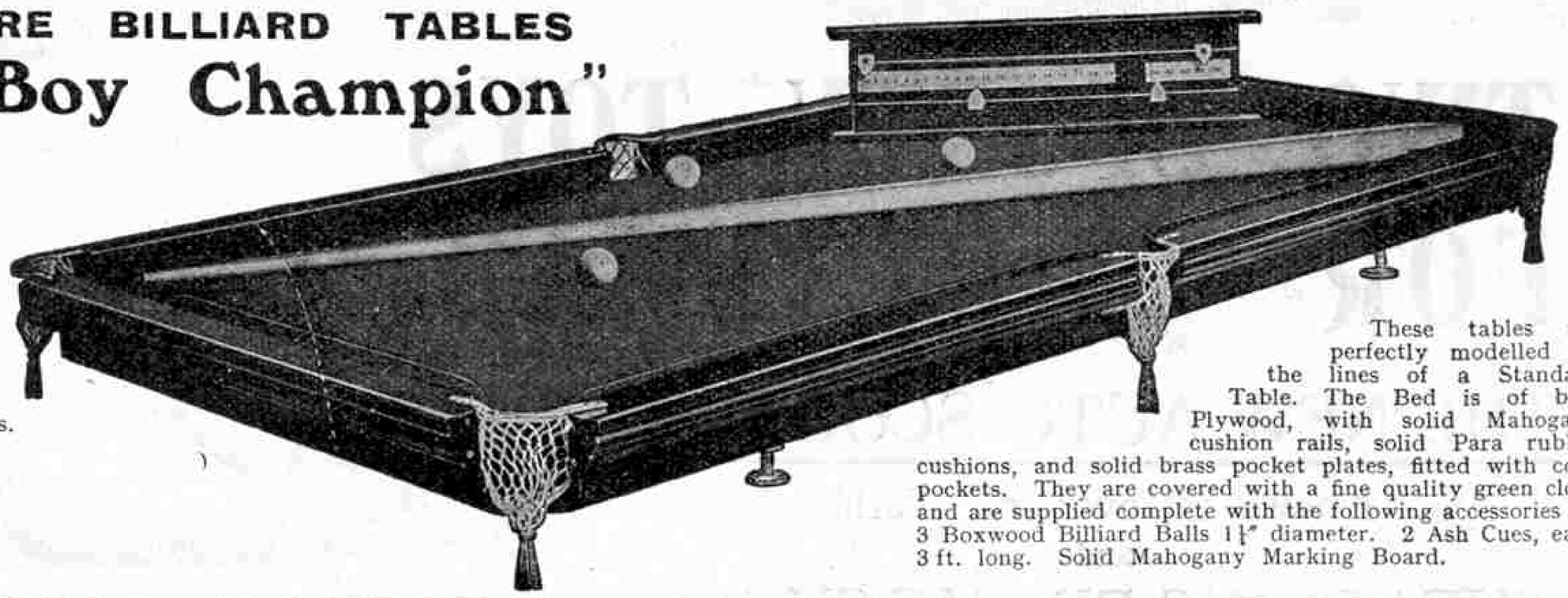
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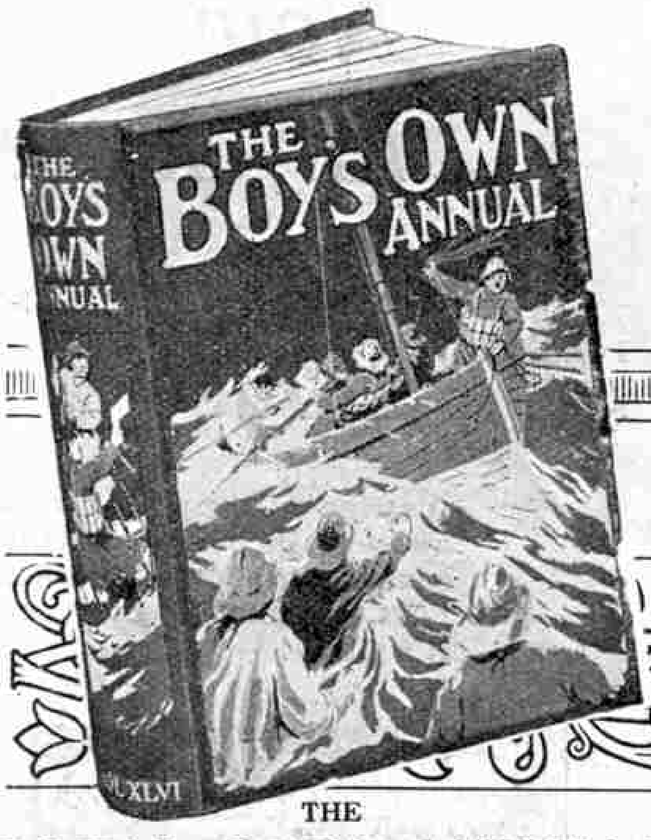
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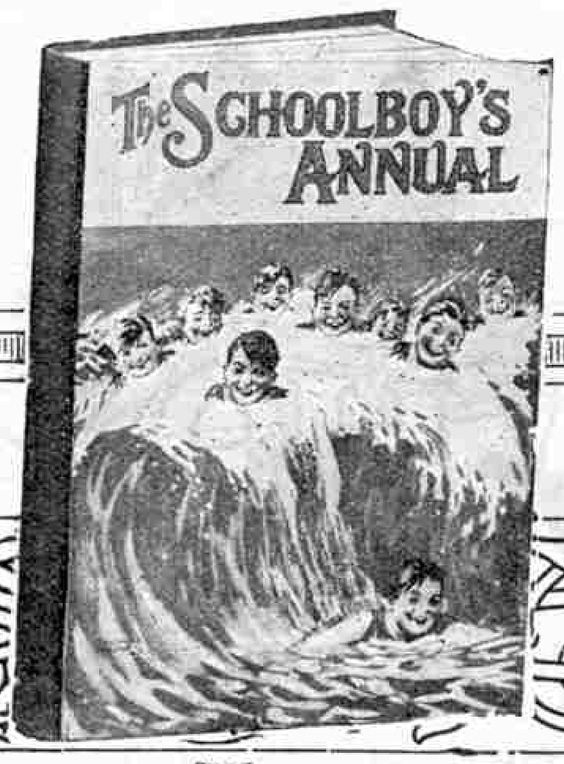
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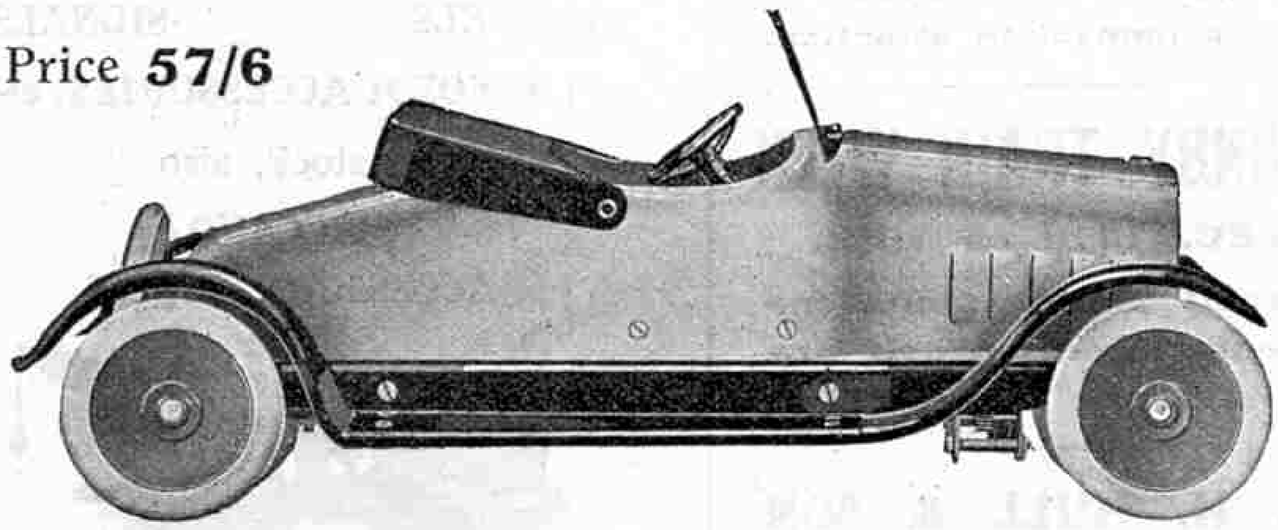
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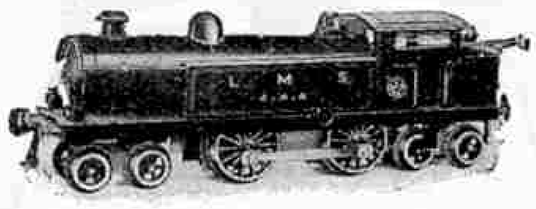
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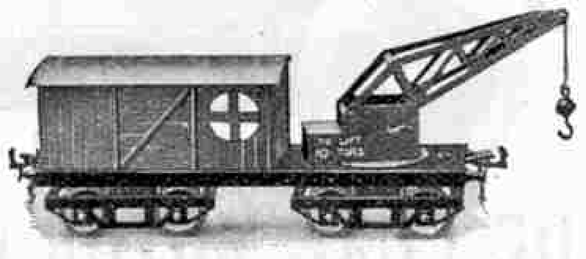


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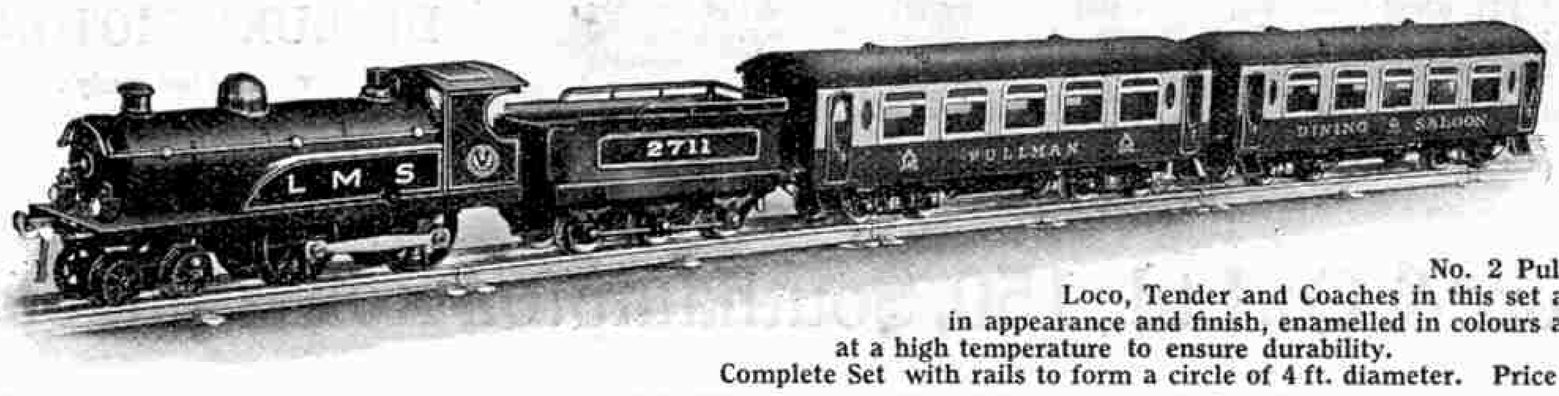
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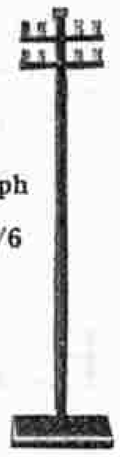
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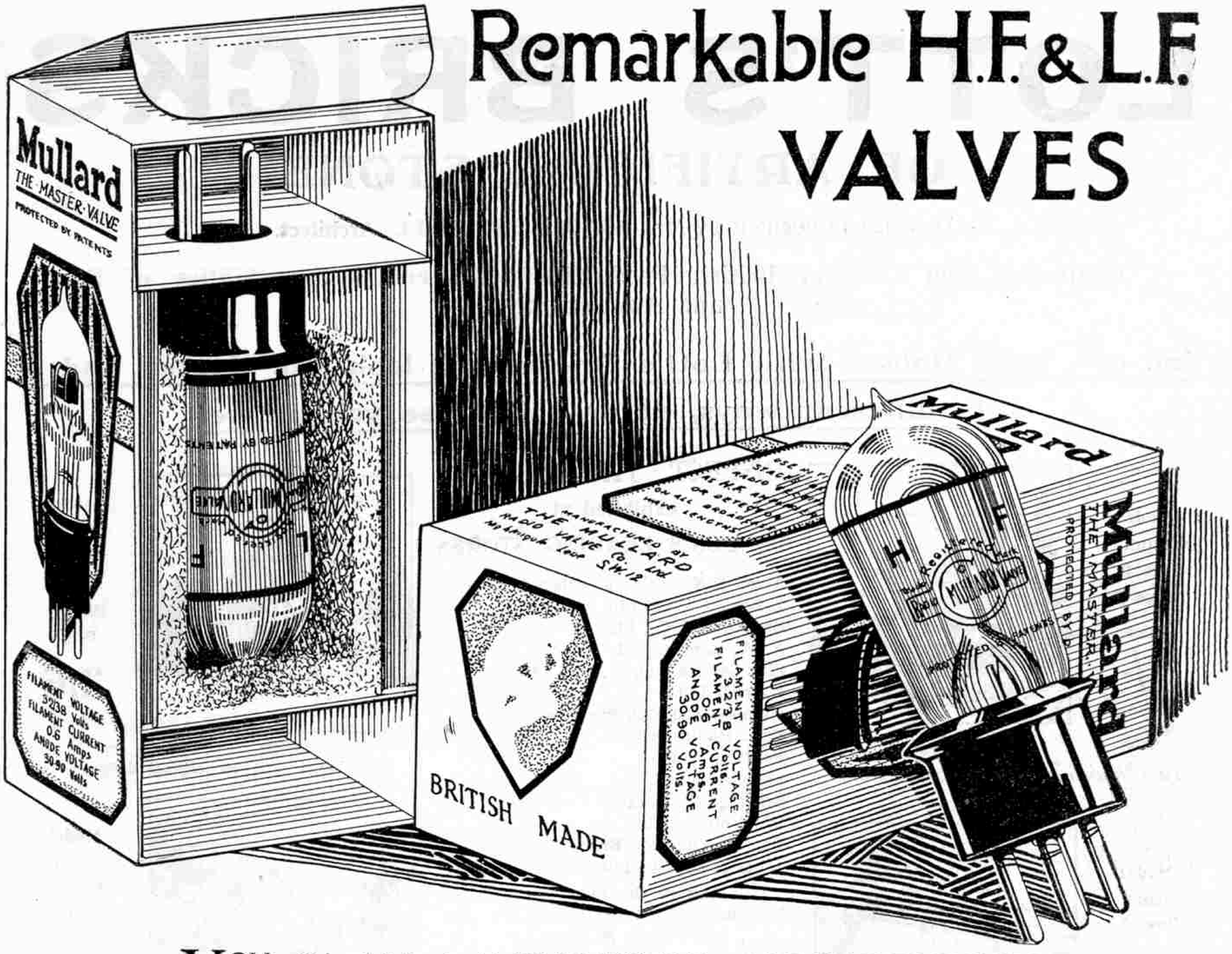


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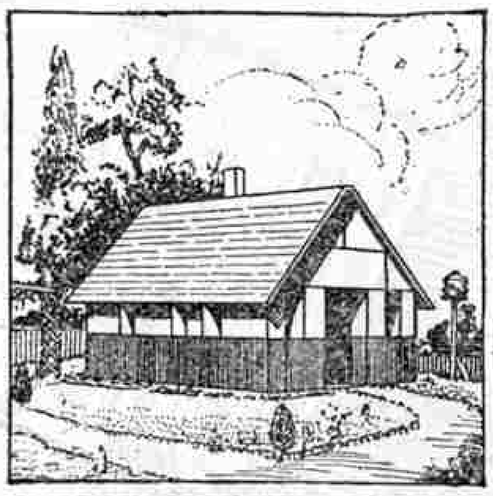
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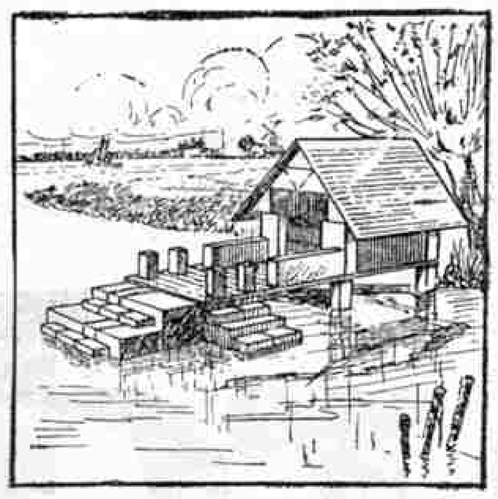
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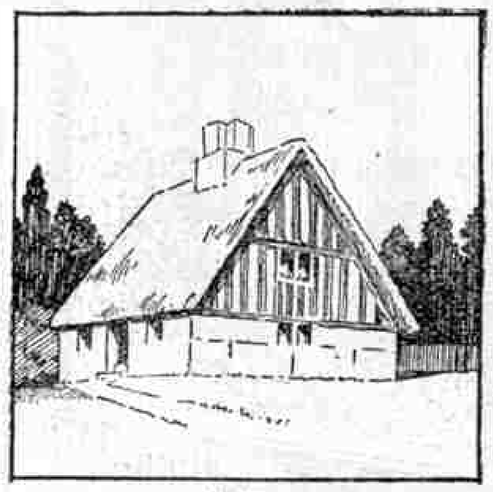
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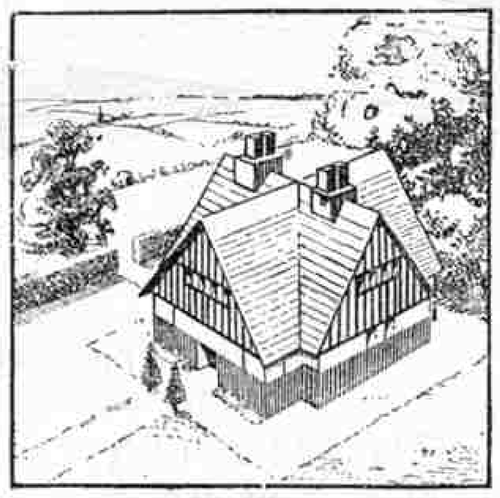
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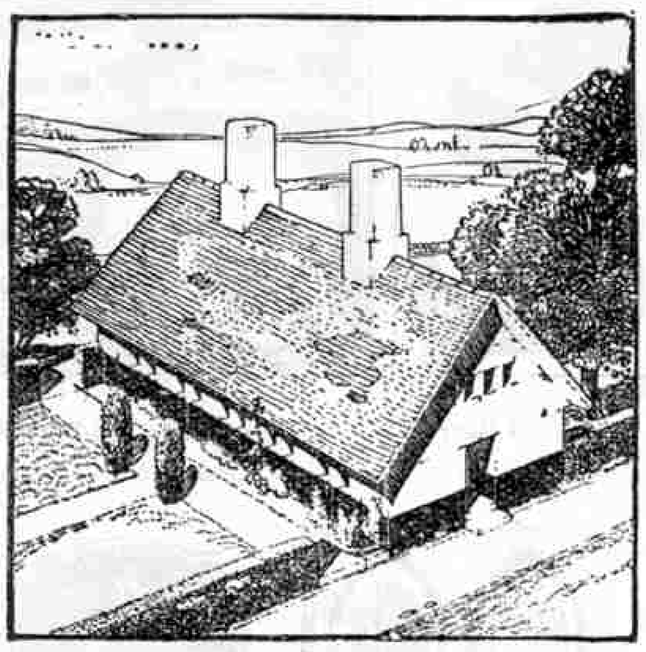
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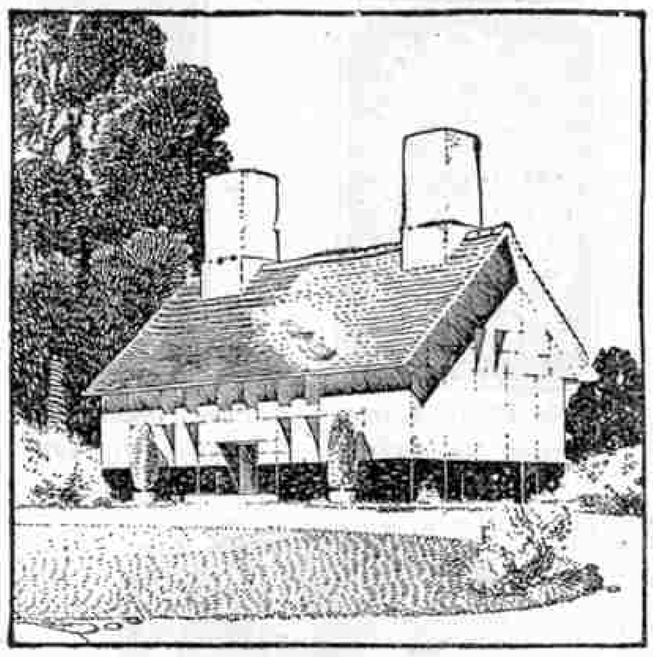


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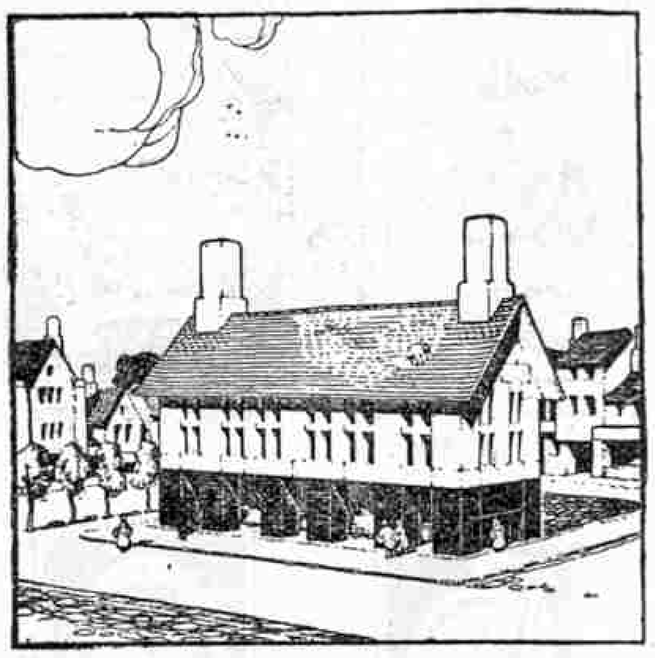
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Cathedral. Box 6, Series B.



Box 6 With designs for 71 Models. Once more it is stated that these typical buildings are only samples of what may be done, there being no limit to the number and variety of buildings which can be devised from this box.

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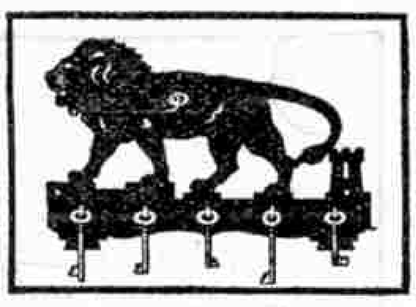
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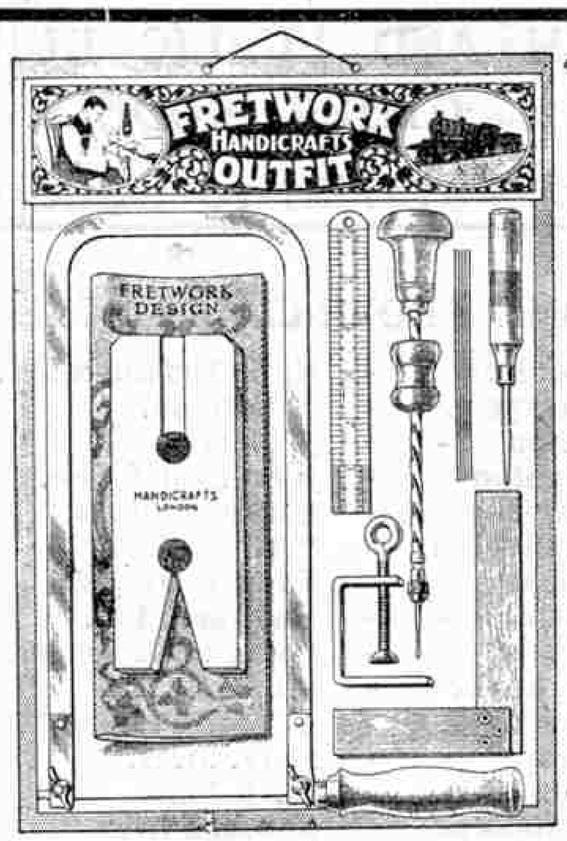
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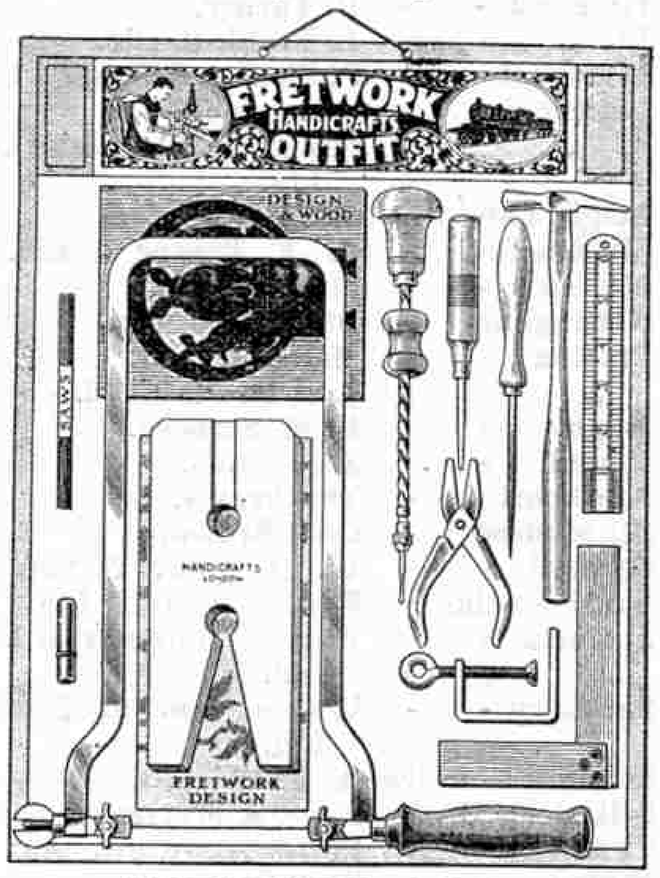


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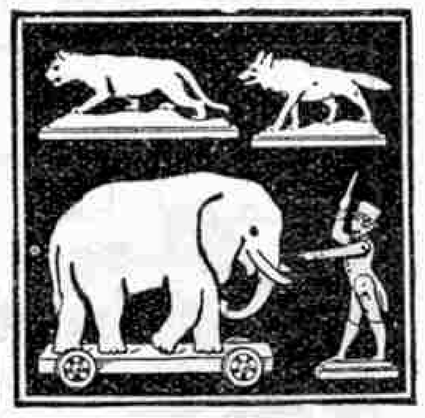
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Hand Mirror
Design No. 5437.



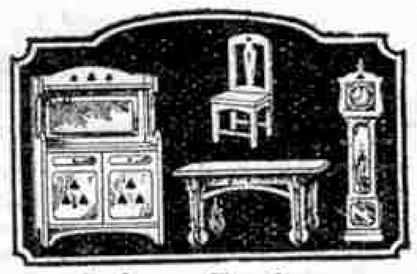
Louis XV. Clock
Design No. 5432.



Birds Photo Frame
Design No. 5371.



Punch Money Box
Design No. 5357.

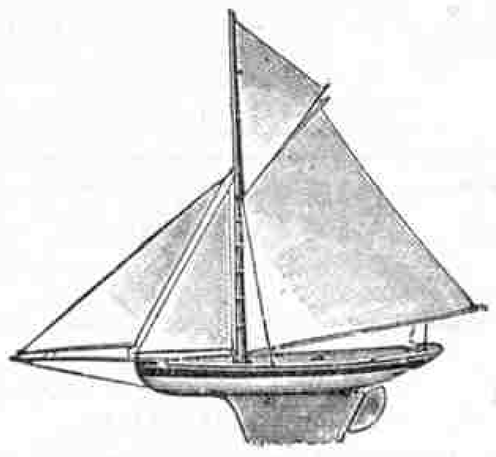


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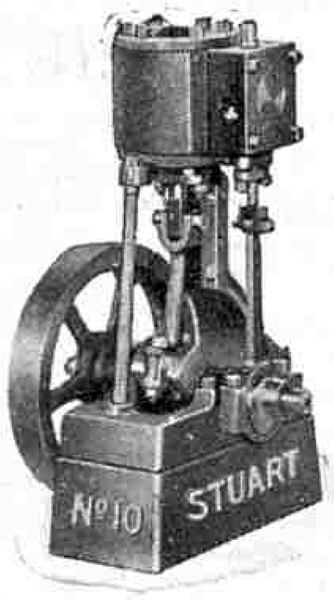
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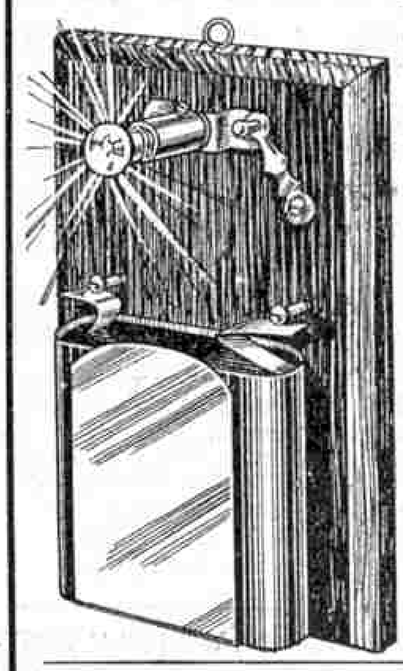
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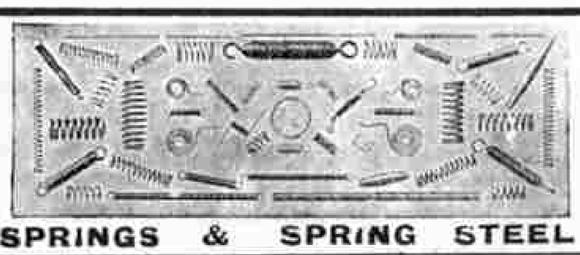
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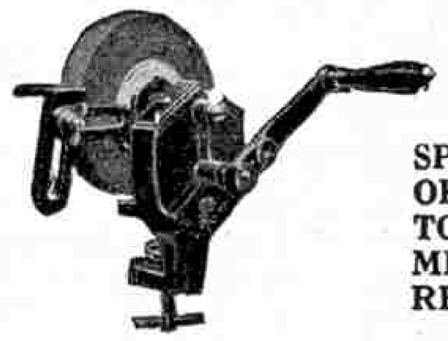
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5/- These wonderful Dynamos—unlike Batteries, etc.—will work for years and years without attention or renewal. They light brilliantly 4-6 volt lamps and are very easy to work. They can be used for many purposes and all "Meccano Boys" will find them of particular interest. GREEN'S unapproachable price—5/- POST AND PACKING FREE. *Lists Free.*



Special **"De Luxe"** model, larger and giving approx. three times the output of our 5/- size, 10/- POST AND PACKING FREE. **"Super De Luxe"** model, larger still and giving approx. five times the output of our 5/- size, 15/- POST AND PACKING FREE. *Lists Free.*

GREENS (Dept. A.N.), 85, New Oxford Street, London, W.C.1.

5/-



Readers' Sales & Wants



If you have anything to sell or wish to buy anything take advantage of the service offered by a small advertisement in these columns.

The "*M.M.*" is read by approximately 100,000 people every month. It circulates in every country where the English language is spoken. If you wish to sell your duplicate stamps, your rabbits, or your tools, or to purchase a loud speaker, a steam engine, a model yacht, or a hundred-and-one other things, you will be able to do so through the columns of the "*M.M.*"

The rates are one penny per word, with a minimum of 1/- (cash with order).

Your advertisement must be received before the 10th of the month for insertion in the following month's issue.

If a Box Number is used, 4d. should be added to cover the cost of postage of the letters to the advertiser from this office. The letters will be posted one week after the advertisement appears, and a second batch a month after the advertisement appears. They will be sent more frequently if additional postage is included with the advertisement.

IMPORTANT.—Advertisements dealing with any article in the current Meccano catalogue cannot be accepted.

READERS' SALES

(*Rate: 1d. per word, min. 1/-*).

Loud Speakers. A.T.M. Loud Speaker for sale, made by Automatic Telephone Co., 2000 ohms resistance. Complete 25/–, post paid. Box 1206.

Turn your stamps into cash! Collector is open to buy any small or large stamp collections. Let me know what you have to sell and price. Box 1208.

Second-Hand Conjuring Tricks. Stamp for list.—Whitehead, 149a, Rochdale Road, Bacup, Lancashire.

First forty-five numbers "Popular Wireless." What offers?—Alex. Taylor, 73, High Street, Laurencekirk, Kincardineshire.

Printing Machine, self-inking, with type, etc., 18/–. Stamp for particulars.—Allerton, Monkspath, Shirley, Birmingham.

Scale Model Passenger Express Loco, 25/–; Signal Cabin, 10/–; Bogey Coach, 10/–; Magic Lantern, 7/6.—Apply A. Black, 9, Somers Place, Hyde Park.

Powerful Steam Locomotive and Rails, 10/–. A beautiful Diana Air Rifle, 10/–, in good condition. A complete Angling Set, almost new, 10/–, cost double.—Richardson, Hook Norton, Banbury, Oxon.

1,000 Well-mixed Stamps, 1/3, post free.—Smith, 108, Brewer Street, S.E.18.

Cinematograph for sale, practically new, can be used as magic lantern, all complete with several hundred feet of Max Linder comedy film and about 15 slides, a very serviceable machine with adjustable lens, 32/–.—A. Crisp, below.

Lancaster Lantern, new, size 15 in. high × 16 in. long, 3-wick lamp, 6 in. focus, about 5 doz. slides 3½ in. × 3½ in. which include "The Monks of St. Bernard," "The Battle of Waterloo," scenery, comic, and a remarkable slide of Vesuvius in eruption, 35/–, or nearest offer.—A. Crisp, below.

Printing Press, very good condition with 5 founts of new type, cost about £7, receipts can be shewn. £2/10/– or offers.—A. Crisp, 51, Stourbridge Road, Kidderminster.

New De-Luxe B.S.A. 3-speed 22 in. Cycle (ridden once), £5/10/–. 1922 Sun-Villiers Lightweight Motor Cycle, 2½ H.P., 2 Stroke (unused since 1922), Price £14.—Dr. James, 74a, Lansdowne Road, Holland Park.

Cinematograph for sale, in perfect working order, automatic take-up, acetylene lighting, 50/–.—Barnfather, 6, Hamilton Road, Willesden, N.W.10.

Direct from Binders, 4 vols. "Hutchinson's Story British Nation," cost £4/4/–, accept £3/10/–, or nearest offer.—L. Whymark, Upper Road, Little Cornard, Sudbury, Suffolk.

For Sale. Quantity of straight and curved rails by Bassett-Lowke.—Apply W. Golding, 17, Church Street, Diss, Norfolk.

For Sale. Nine "Chums," 1924. Monthly, 4/–. 36 Large, 12 Small Fretwork Designs. Best offer. Exchange for Boy's Books.—Box 1212.

READERS' WANTS

Wanted. Collector desires to purchase small collection of stamps. No rubbish. Send particulars in first instance to Box 1207.

Wanted. Good prices offered for used or unused stamps of any country of 3d., 6d., 1/– values and over, either of current or earlier issues. Box 1210.

Wanted, two back numbers of the "Meccano Magazine," September, October, 1923, at a shilling each. Write early.—Sidney Drinkwater, Ladywood, Fernhill Heath, Worcester.

Palestine. Collector of stamps of this country desires to purchase used or unused stamps, first or subsequent issues. Readers of the "*M.M.*" living in Palestine are invited to communicate. Box 1211.

Highest offers immediately for rare stamps.—Sewell, 51, Lancaster Gate, Hyde Park, London.

"*M.M.*" Readers Overseas. Collector desires to purchase stamps of all countries, old or recent, single copies or dozens. No common low-value stamps wanted but best prices paid for high values such as 6d., 1/–, 2/6 and upwards, used or unused. Box 1209.

SMALL ADVERTISEMENTS

(*Rate: 1/- per line*).

Patents, Advice, Handbook and Consultations Free. B. T. King, C.I.M.E., Regd. Patent Agent, 146a, Queen Victoria Street, London, E.C.4. 38 years' reference.

SEND 9/9 for Model Petrolmotor Castings with Cylinder Bored. List 31.—T. Butler, Wade Avenue, Littleover, Derby.

SEVERAL LEADING CORRESPONDENCE COURSES for sale cheap. Particulars free.—R. Clemoes, St. Budeaux, Devonport.

BATTERIES FREE to every eighth purchaser. Particulars stamp.—Nield, 38, Bridge Street, Derby.

Blushing, Self-Consciousness, Nervous Timidity. Genuine Cure. No exercises. Send only 1½d. Stamp. F. A. Hughes, 7, Southampton Row (B57), London, W.C.1.

GENT.'S 9-CARAT GOLD WATCHES, 15 Jewel Lever Movement, **£5/10/–,** post paid (guaranteed).—Banks, Drub Lane, Gomersal, Leeds.

FOOTBALLS. Clearance Sale of Footballs at bargain prices, real match 12 piece as used by the best teams and GUARANTEED. Price 12/– complete with bladder.—A. Crisp, 51, Stourbridge Road, Kidderminster.

Gent.'s Strong Nickel Keyless Watches, 4/11, post paid (worth double).—Banks, Drub Lane, Gomersal, Leeds.

VEST-POCKET WIRELESS. Tested and guaranteed 20 miles, 2/4. Phones, etc., extra.—H. J. Hopkins, Dept. M.M., 8, Sparkenhoe Street, Leicester.

EDISON 4 minute Blue Amberol Phonograph Records, reduced prices. New goods now arriving. Lists.—A. Robinson, 333, Hainton Avenue, Grimsby.

CINEMA FILMS.

SALE—HIRE—EXCHANGE, also Machines, Re-winders and Accessories. Good Sample Film, 1/– Post Paid.

LISTS FREE.

Filmeries, 57, Lancaster Rd., Leystonstone, London, E.11

CINEMA MACHINES AND FILMS CHEAP. Lists free.—Universal, 112, Newington Causeway, S.E.1.

CINEMA FILMS for Christmas. Every class in stock. All prices post free. Lists free. Let us know your requirements.—Hill, 1, Victoria Road, Dartford.

CINEMA MACHINES AND FILMS AT BARGAIN PRICES. Write for latest list "Home Cinemas."—244, Romford Road, Forest Gate, London, E.7.

CINEMA FILMS, 100 ft. 1/–; 1,000 ft. 6/–, delivered.—Phillips, 64, Ewart Street, Brighton.

MECCANO BOYS! Bargain Films, 100 ft. 6d. Films hired, 4d. each.—Photoplays, Pinden, Dartford.

CINEMATOGRAPH FILMS

For Sale—Hire—Exchange. 100 ft. sample 10d., post paid. Projectors and Accessories cheap. Write for lists and particulars of Special Christmas Offer.—Don Cinematograph Supply, 96, High Street, Penge, S.E.20.

CINEMAS AND WIRELESS

for Xmas, do your shopping by Post. A large variety of Films, Machines and Accessories. Free Lists. or 100 ft. film and lists, 1/–.

J. Humphreys, 40, Davenant Road, London, N.19.

CINEMATOGRAPH FILMS, Machines, Accessories, Bargains. 100 ft. Film and List 1/–.—Tottenham Film Exchange. Offices, 2, Ascot Rd., S. Tottenham, N.15.

CINEMATOGRAPHS CHEAP.—Monster Lists, 100ft. Film 1/– posted.—Pictures, 109, Kenlor Rd., Tooting.

CINEMATOGRAPHS—(*see page* 420)

MECCANO MAGAZINE

Registered at G.P.O., London, for transmission by Canadian Magazine Post.

EDITORIAL AND ADVERTISING OFFICES:—

BINNS ROAD, LIVERPOOL.

Telegrams: "Meccano, Liverpool."

Publication Date. The "*M.M.*" is published on the 1st of each month and may be ordered from any Meccano dealer, or from any bookstall or newsagent, price 3d. per copy. It will be mailed direct from this office, 2/– for six issues and 4/– for twelve issues (post free).

To Contributors. The Editor will consider articles and photographs of general interest; payment will be made for those published. Whilst every care will be taken of those submitted, the Editor does not accept responsibility for any loss or damage. A stamped addressed envelope should be sent where it is desired that the contribution should be returned if unacceptable.

Binding Cases. Spring-back Binders to take a number of "*M.M.'s*" are supplied, covered with imitation leather and lettered in gold, price 3/– each (post free).

Meccano Writing Pads. Fifty sheets of tinted bank paper, each printed with Meccano boy at head, 1/– (post free).

Advertisements

Readers' Sales and Wants. Private advertisements (*i.e.*, not trade) are charged 1d. per word, minimum 1/–. Cash with order. Editorial and Advertising matters should not be dealt with in the same letter.

Small Advertisements. 1/– per line (average seven words to the line), or 10/– per inch (average 12 lines to the inch). Cash with order.

Display. Quotations for space bookings, and latest circulation figures, will be sent on request.

Press Day, etc. Copy must be received not later than 10th of each month for publication in following issue. Half-tone blocks up to 100 screen.

Proofs of advertisements will be sent when possible for space bookings of not less than half-an-inch.

Voucher Copies. Sent free to advertisers booking one inch or over. Other advertisers desiring vouchers should add 4d. to their remittance and should order voucher copy at same time.

Remittances. Postal Orders and Cheques must be made payable to Meccano Ltd.

Obtaining the "*M.M.*" Overseas

Readers Overseas and in foreign countries may order the *Meccano Magazine* from regular Meccano dealers, or direct from this office. The "*M.M.*" is sold Overseas at 3d. per copy, or mailed (post free) direct from Liverpool, 2/– for six issues, or 4/– for twelve issues.

IMPORTANT.

Overseas readers are reminded that the prices shown throughout the "*M.M.*" are those relating to the home market. Current Overseas Price Lists of Meccano Products will be mailed free on request to any of the undermentioned agencies. Prices of other goods advertised may be obtained direct from the firms.

CANADA: Meccano Ltd., 45, Colborne Street, Toronto.

AUSTRALIA: Messrs. E. G. Page & Co., 52, Clarence Street, Sydney, N.S.W.

NEW ZEALAND: Messrs. Browning Ifwersen Ltd., P.O. Box 129, Auckland.

SOUTH AFRICA: Mr. A. E. Harris (P.O. Box 1199), Textile House, Von Brandis St., Johannesburg.

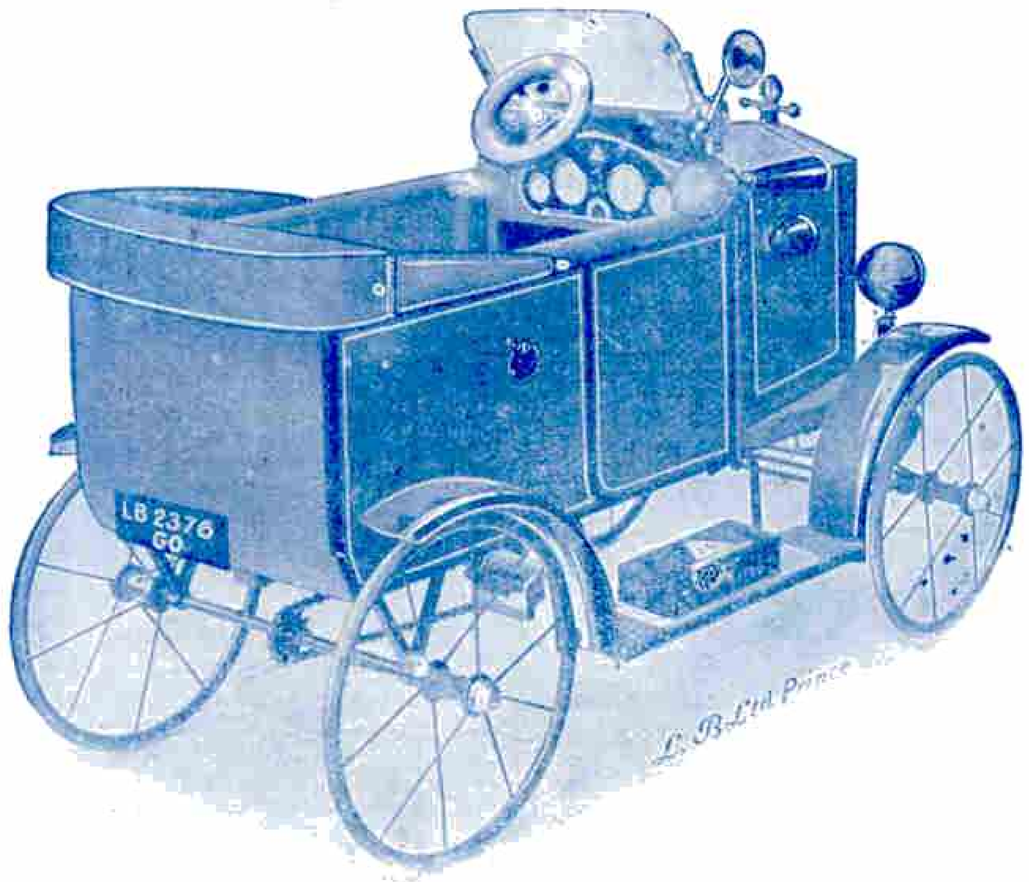
MAKE YOUR OWN ELECTRIC CLOCK. The Synchronome Co. gives permission to amateur mechanics to make a Master Clock for their own personal use and not for re-sale. Blueprint, castings and parts from—The Synchronome Co. Ltd., 32/34, Clerkenwell Road, E.C.1.

Baty's Two B.B.C. Receivers from £3/15/– (royalty 25/–) up to **£10/17/6** Cabinet Set. Illustrated technical reprints of "Baty" circuits, **1/3** post free. "The best two-valve set yet heard." "Absolutely efficient." "Wonderfully simple." From all retailers or—Ernest M. Baty, Luton.

WIRELESS. 37 Cabinet Broadcast Crystal Receivers, 12/6 each. 45 high-class 4000 ohm Headphones, 12/6 pair.—The Electric Laboratory, Enfield Wash.

EGYPTIAN MAGIC. 331 2/6 bottles of "Invisible" Trick Ink. Endless fun. Post free, 1/6 each.—Laboratory, Enfield Wash.

Ask Daddy to get you one of these Toys—*they are just like the 'grown ups' use —only smaller*



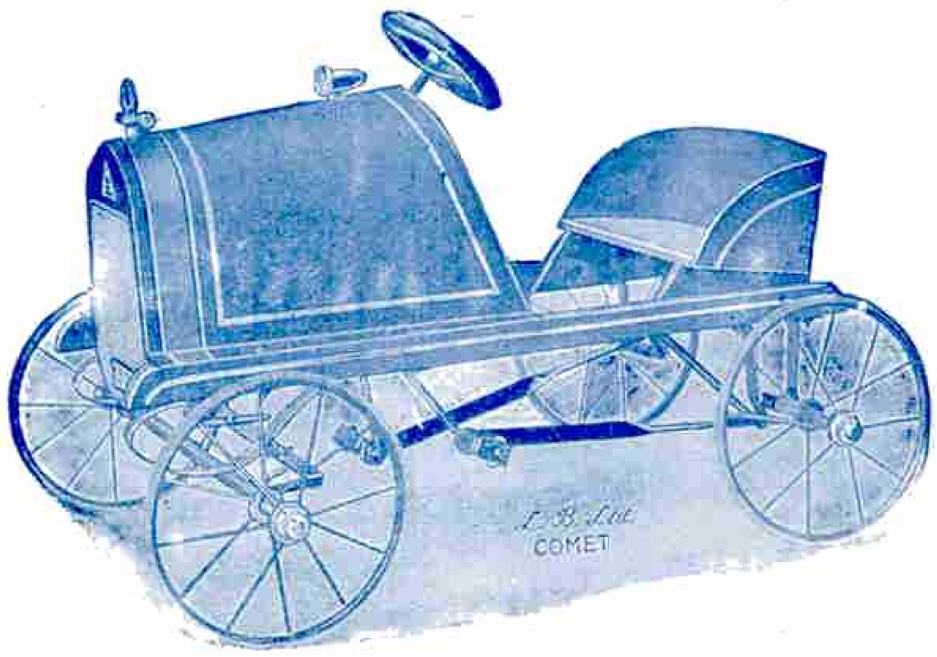
The "PRINCE"

This luxurious model with the Rolls-Royce type radiator has everything the heart can desire, including instrument board with clock speedometer, oil indicator, voltmeter and switch, dummy hood and "stop" and "go" signal tool box, etc., 12 in. wired-on tyred wheels. Suitable for children up to 10 years **99/-**

Always insist on seeing the celebrated Red and Black Triangle Trade Mark on all good Toys and avoid spurious imitations. It is a guarantee of Quality and Value and of British Manufacture.

The "COMET"

27/-



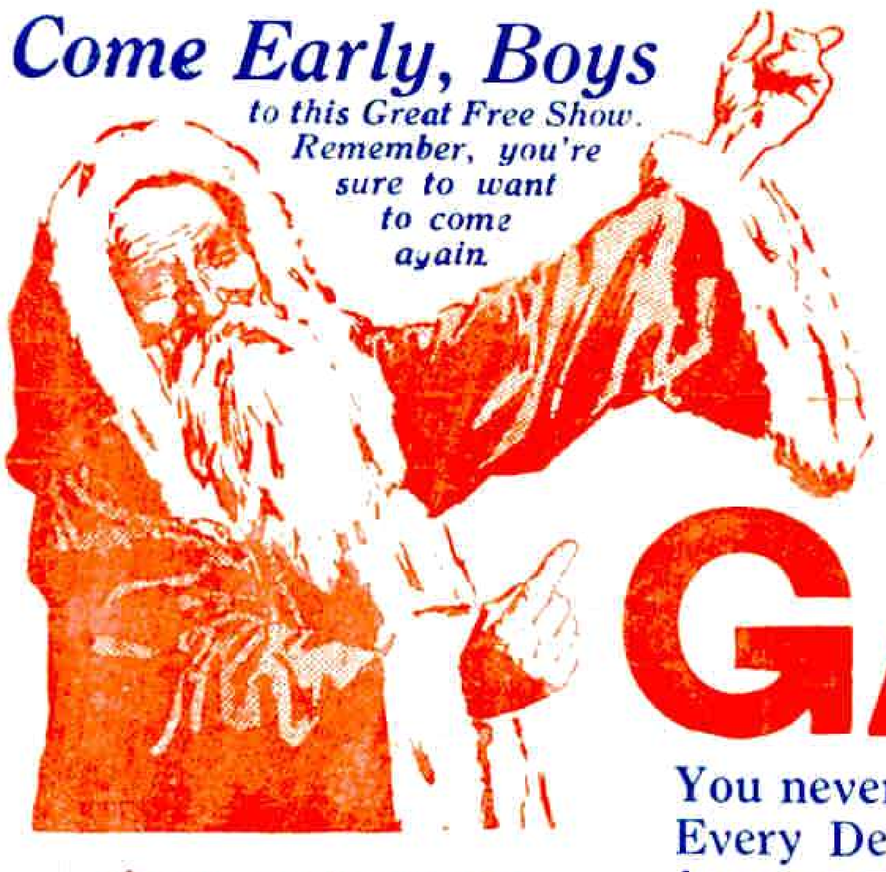
A very natty Auto for the speed merchant. It has a double crank movement, 10 in. wired-on tyred wheels, lamp, etc. For ages 2–7 years.

Lines Bros.' Toys are miles better than any others. They are made just like the real thing on a small scale. They are "made in England" and are so strong and well finished that they will last for years and stand no end of knocking about. Here are illustrated two of our typical examples, but there are dozens of others. If you do not see exactly what you want ask Daddy to write for further details.

OBTAINABLE AT ALL GOOD TOY SHOPS AND STORES

Wholesale only:

LINES BROS. LTD., 9, Fore Street, London, E.C.



Beckoning Britain's Youth to THE WORLD'S GREATEST XMAS BAZAAR AND TOY FAIR AT GAMAGES

You never saw such a Splendid Show in all your life ! Every Dept. (and there are many) has a wonderful Array of Toys and Gifts which have been gathered together to make Christmas 1924 the jolliest you've ever known.

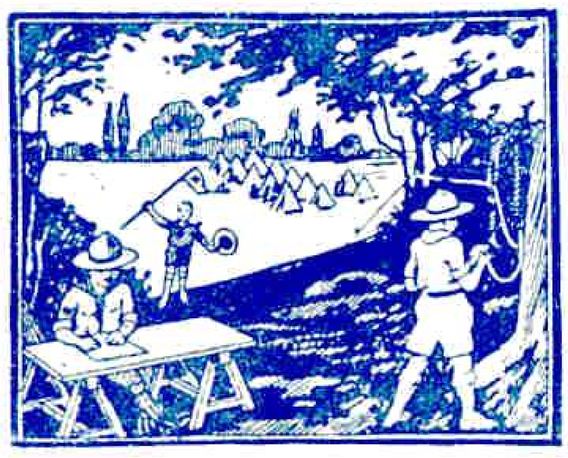
Come and see the

Animals' Jazz Band in full blast.

Miniature Yacht Races in the Boating Lake.

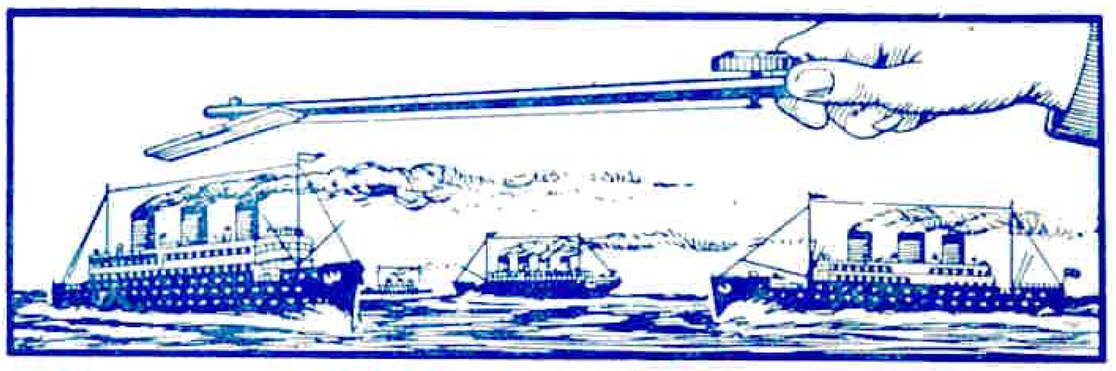
Soldiers in full uniform marching over the Hills.

Trains dashing through Lilliputian Stations and Tunnels.



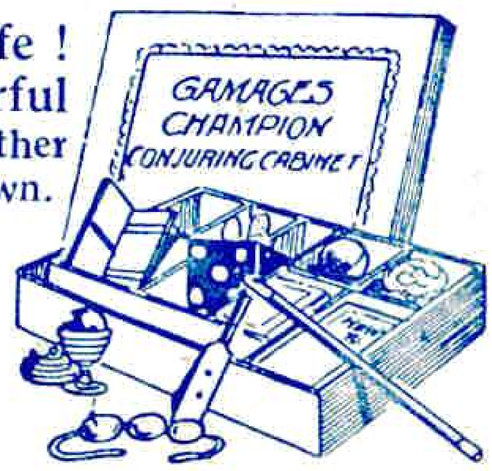
LINE TELEGRAPHY

The Auto-Electric Telegraph Sounder Set consists of two complete Stations, which may be used for either receiving or transmitting signals over considerable distances, varying with the battery power and the length of the line wire used. The batteries supplied with the set have sufficient power for transmitting signals over forty feet of line. Post 6d. Price **13/6**



Magnetic Wireless Control Boats

By means of the strong polished steel Magnet at the end of the Control Staff, these boats can be manœuvred *without touching them*—just like real ships—backwards, forwards, and turned round in their own length. In fact, all the evolutions of a real ship may be reproduced. Set comprises Boat and Control Staff with Magnet, complete in Box 14 × 3¼ in., and full instructions for use and suggestions for games. PER SET **3/6**



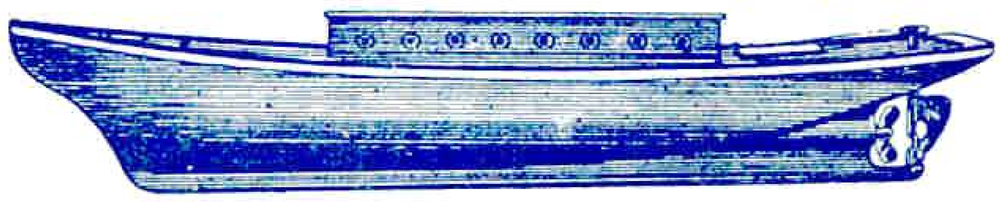
CONJURING !

Take up Conjuring—it's a splendid hobby and one that you will not tire of. Think of the fun of giving your friends a free show of magic ! At the Christmas Parties, too, it's always much appreciated. At Gamages you can get a splendid box of conjuring tricks, with full instructions, for Post 4d. **3/-**

Ditto, containing a larger number of tricks and illusions, with instructions. Price Post 5d. **4/6**

CABINETS OF TRICKS, 7/9, 10/9, 15/9, 22/6, 35/- 42/- 63/- 84/- 105/-

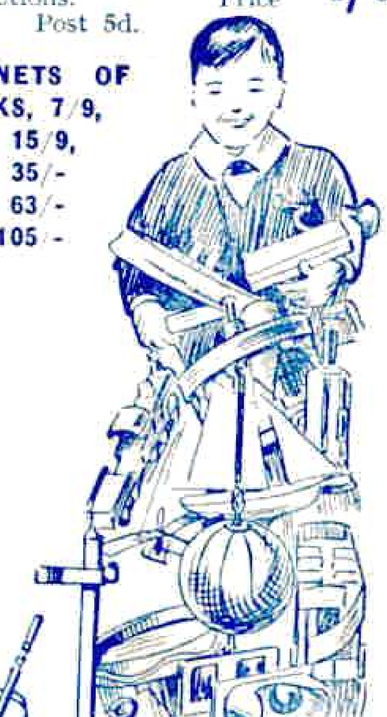
GET A MODEL LAUNCH!



STEAM OR ELECTRIC LAUNCHES

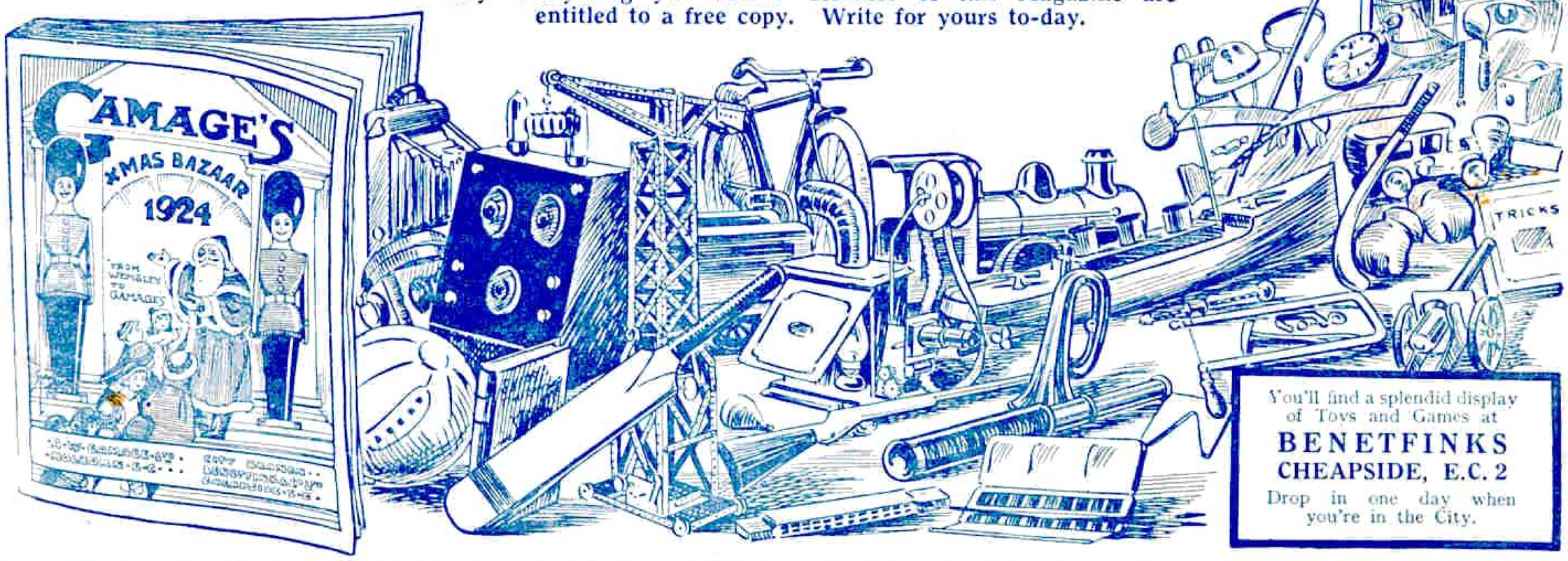
(Without machinery). Carved from best flawless yellow pine, with long hatch to take machinery. Mahogany fittings. Beautifully finished and enamelled, as illustration, 24 in. long. Price **31/-**

27 in. long, **38/6** 30 in. long, **48/6** 33 in. long, **58/6** 36 in. long, **72/6**



All These Things and 1,001 Others

are in our Monster Xmas Catalogue. The Cover (shown below) is designed in seven beautiful colours by the famous Artist, Mr. LAWSON WOOD. The Book is profusely illustrated with all those things so dear to the heart of the Boy—everything you want ! Readers of this Magazine are entitled to a free copy. Write for yours to-day.



You'll find a splendid display of Toys and Games at

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CHEAPSIDE, E.C. 2

Drop in one day when you're in the City.

A. W. GAMAGE LTD., HOLBORN, LONDON, E.C.1.

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